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State of New York.

REPORT OF DR. FITCH
ON THE
NOXIOUS AND OTHER INSECTS,
DETRIMENTAL TO AGRICULTURE,
ALSO
AN ADDRESS,
DELIVERED BEFORE THE
NEW YORK STATE AGRICULTURAL SOCIETY.

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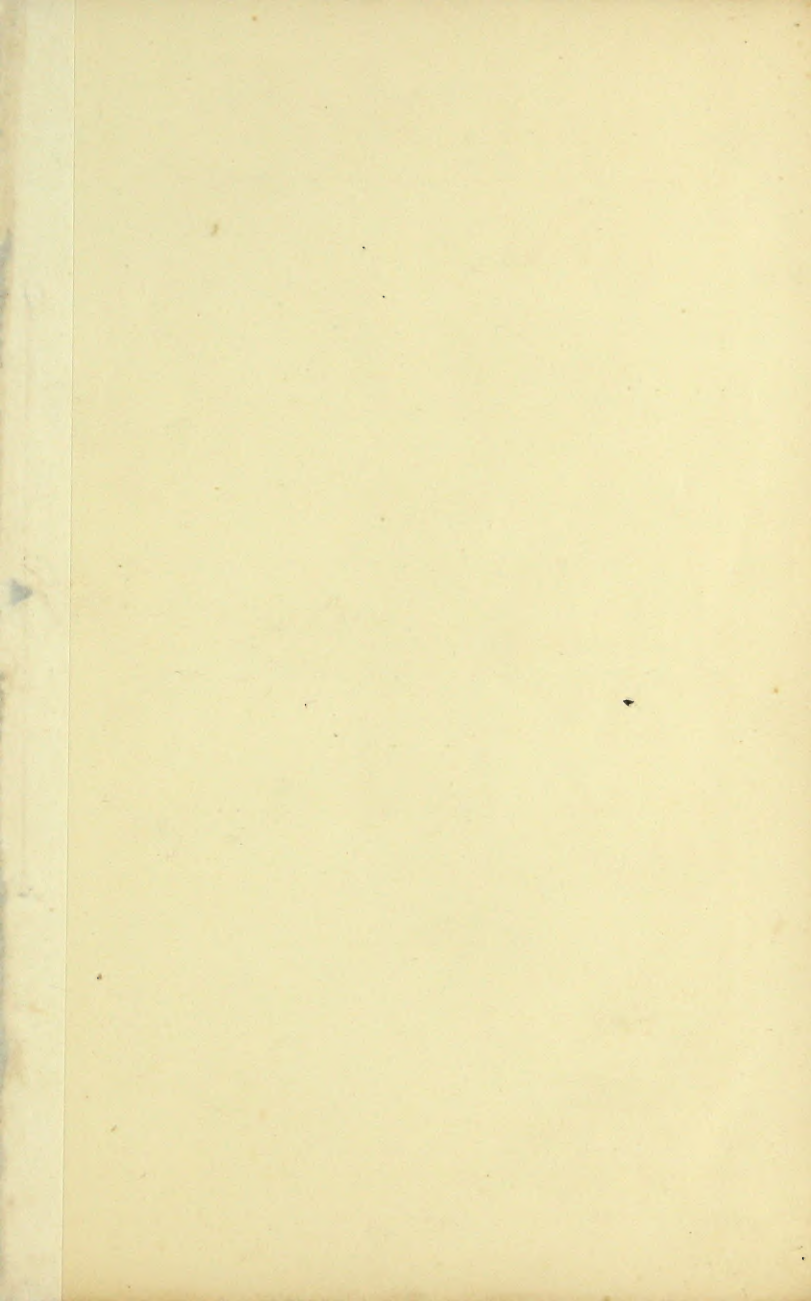
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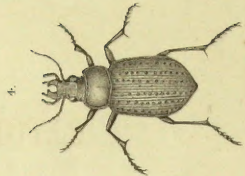
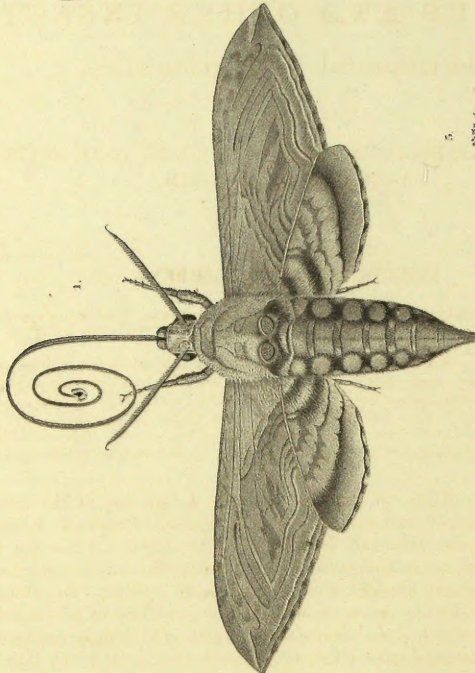
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INSECTS. PLATE 4.
(Moths of Cut-worm &c.)

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REPORT OF DR. FITCH
ON THE
NOXIOUS AND OTHER INSECTS
Detrimental to Agriculture.

ALSO
AN ADDRESS DELIVERED BEFORE THE NEW YORK STATE
AGRICULTURAL SOCIETY.

INSECTS INFESTING GARDENS.

9. NORTHERN TOBACCO-WORM, POTATO-WORM, TOMATO-WORM, *Sphinx quinquemaculata*, Haworth. (Lepidoptera. Sphingidæ.) Plate 4, fig. 1.

Eating the leaves of potatoes, tomatoes, and tobacco, in July and August, a large green worm, the size of one's finger, with a black horn at the end of its back and along each side a row of seven white or pale yellow marks resembling the letter < with its pointed end forward; lying under ground in its pupa state during the winter and spring, and producing a large gray moth, four and a half inches wide across its extended wings, having a row of five yellow spots along each side of its body and two narrow black zigzag bands across the middle of its hind wings.

Hon. William Kelly, in a letter enclosing to me one of the millers which had been obtained from the tobacco-worm by Charles L. Roberts, Esq., of Tariffville, Ct., well remarks that the culture of tobacco has become so important an interest now at the North, that any information in regard to its insect enemies will be read with interest. Mr. Roberts alludes to this tobacco-worm as being quite prevalent in his vicinity. And the pains which some other correspondents and friends engaged in the culture of tobacco have taken to transmit specimens of the worm or the miller to me is an evidence of the importance they attach to this insect. And it may well be regarded as an important enemy; for this tobacco-worm makes the growing of tobacco twice as laborious a task as it would be if we had no such insect in our country.

This is currently supposed to be a new insect here at the North, unlike anything which we previously had, and that its presence here is due to the extensive growing of tobacco which has recently been commenced. It, however, is the same worm which, from time immemorial, we have been accustomed to meet with in midsummer upon our potato vines, and

TOBACCO-WORM. THE NORTHERN AND SOUTHERN SPECIES.

with which we have become more familiarly acquainted from seeing it so frequently upon the tomato vines ever since this vegetable came into general cultivation in our gardens. And it has obtained the names Potato-worm, Tomato-worm, and now Tobacco-worm, as it occurs upon one or the other of these plants, most persons supposing it to be a different insect in each case. These three plants are closely related to each other, all pertaining to the same Natural Order, SOLANACEÆ and this insect feeds upon each of them without appearing to manifest any preference for one over the other. It feeds equally well, also, upon other species of the genus *Solanum*, to which the potato pertains. I once met with two full-grown worms upon a vine of the bittersweet (*Solanum Dulcamara*) which was growing so distant from any potatoes that it was evident they could not have strayed from that plant, but must have come from eggs which the parent had laid upon this vine, knowing it to be perfectly adapted for nourishing her young. It is probable that it can also nourish itself upon the stramonium, henbane, and most other plants of this Natural Order.

The tobacco-worm which is common at the South and such a great pest to the plantations there, is a different species, but so closely like this in its size, colors, markings and habits, both in its larva and perfect state, that the two insects were for a long time confounded together. It is now just a century ago that the miller or moth of the southern tobacco worm was scientifically named *Sphinx Carolina* by Linnæus; and it was fifty years later in 1802, that our insect was separated as a distinct species by Mr. Haworth, who gave it the name *Sphinx 5-maculatus*, or the Five-spotted Sphinx, Hubner some years afterwards giving it the name *Celeus*. I suppose it to have been through an oversight that authors generally have copied the original name from Mr. Haworth in its masculine form, which is evidently an inaccuracy. Mr. Clemens, in his Synopsis of North American Sphingidæ, (Journal Acad. Natural Sciences, new series, vol. IV, p. 166,) cites Dr. Harris as describing the *Carolina* in his Catalogue of North American Sphinges (Silliman's Journal, vol. XXXVI, p. 294), whereas it is clearly the *5-maculata* which is there described under the name *Carolina*. He also gives both these species as being distributed generally throughout the United States. But over most of New England and New York the *5-maculata* is the exclusive species. I have no knowledge of the *Carolina* as occurring except in the southern sections of our State, where, and throughout the middle States, the two species are found associated together; whilst farther south this disappears and the *Carolina* alone is met with, its geographical range extending onward through Mexico and the West Indies, and into South America, probably as far as the tobacco grows.

As already remarked, the two insects are closely alike both in their larva and their perfect states. The worms are of a bright green color, their skin is wrinkled transversely and is commonly dotted over with white, and they are both marked with a row of oblique white stripes along each side of the body; but in the southern worm there are no longitudinal white streaks meeting the lower ends of these oblique ones to form the V-like marks which we invariably see upon our northern worm. In their perfect state the

millers of both species are of a gray color with a row of five yellow spots along each side of the body, these spots being bordered with black, and the wings are varied with brown clouds and obscurely marked with black lines, and on their undersides the hind wings are crossed by two blackish zigzag bands, which are also obscurely traced upon the forward pair. Thus they are so alike in their colors, and in so many of those spots and marks which are most conspicuous, and which the eye first notices, that you feel quite certain on looking them over, that they are both one species. It is only when you come to closely inspect some particular points that you detect such discrepancies as assure you they really are different insects. The plainest mark of distinction between them is the black bands which cross the upper side of their hind wings. In the moth of our northern Tobacco-worm you see two zigzag bands on the middle of the wings, the same as on the underside. But in the southern you observe in place of these a single broad band, which is very slightly, if at all, toothed or jagged along its sides. In addition to this, on the hind body of the former, you notice a slender black stripe along the middle of the back, of which there are no vestiges in the latter. These marks will suffice to enable any one who has either of these millers under his eye to decide which species of the two it is.

We will next relate the biography of our insect.

The moths do not all make their appearance simultaneously, but come out one after another, mostly in the month of July, though continuing to occur abroad until the frosts of autumn have destroyed the flowers from which they are fed. During the day time they remain at rest, hid from view, and come out in the evening to feed and lay their eggs. From its thus appearing abroad upon the wing at the same hours when the musketos are most numerous and annoying; Drury states that the southern species has in some parts of the West Indies obtained the name of the Musketo Hawk, it being also supposed that it is attracted forth at that particular time in order to feed upon these petty torments. This, however, is a great error. The sole food of these moths is the honey of flowers, for obtaining which they are furnished with a remarkably long slender tongue, which, when not in use, is coiled up like a watch spring, and concealed between the palpi or feelers. It may be unrolled and drawn out by inserting a pin into the coil, and when fully extended is five or six inches in length. Thus it is especially adapted for probing flowers which have long slender tubes, such as the tobacco, stramonium, petunia, &c., whose nectaries are beyond the reach of bees and other honey gathering insects. The moth resembles a humming bird in its motions, and also in the sound made by its wings as it is hovering around flowers and sipping the honey from them. The tongue is fully extended at such times; and hereby the moth is poised on its wings at a distance of some inches from the flower on which it is nourishing itself.

The eggs are probably placed on the underside of the leaves of those plants on which its young feeds. The worms which come from these eggs are voracious feeders, consuming a large quantity of foliage and growing rapidly, whereby some of the earliest ones attain their full size by the end of July; but it is during the month of August that they are present upon

TOBACCO-WORM. ITS HABITS. THE PUPA. DEPTH OF ITS INTERMENT.

the plants in the greatest numbers. They move about but little during the daytime, and being of the same green color as the stalks and leaves, they are difficult to discover. Usually, the presence of one of these worms upon our tomatoes is first indicated to us by the large black pellets of excrement which it drops, some of which frequently lodge in the forks of the stalks or adhere to the glutinous hairs of the plant. These pellets are of a short cylindrical form, and deeply grooved lengthwise; and the worm, as if to guard against its presence being betrayed hereby, when it is crawling along the stalks, if it chances to come to one of these pellets, it pauses and takes it up in its jaws and drops it to the ground.

When the worm is grown to its full size it leaves the plant on which it has hitherto been living, sometimes wandering away to a distance from it, and roots down into the ground to the depth of some inches below the surface. It here becomes quiescent, and casting off its larva skin it appears in its pupa or chrysalis form. By this change it is diminished a third in its size and is now of an oval form, four times as long as thick, and covered with a hard crustaceous shell of a glossy bright chestnut color. This pupa of the tobacco-worm is particularly curious from having its forward end prolonged on one side into a long slender limb which is bent backwards, reaching the middle of the body, where its end touches and is firmly soldered to the surface, thus forming a kind of loop resembling the handle to a pitcher—this being the sheath in which the tongue is enclosed, which in the perfect insect becomes developed to such a remarkable length. In this state the insect remains through the winter and spring. It is currently stated that it lies so deep in the ground as to be beyond the reach of the winter's frost, but this point requires further investigation, for frequently in harvesting potatoes this chrysalis is disinterred, lying only a few inches below the surface. Every laborer who has been much employed in digging potatoes, and every boy who has been assigned the task of picking them up, will recollect having noticed it, the curious loop or pitcher-like handle on one side having particularly drawn his attention to it. In the garden, also, where tomatoes have been grown, I have met with it only slightly underground. The subsoil, moreover, beneath where it is loosened by the plow, is in most situations so compact and hard that it would be a very arduous labor for the worm to penetrate downward in it twelve inches or more; and for the moth, after it comes out from the pupa shell, to force itself up such a distance through this compact subsoil, would seem to be quite impossible. We know, furthermore, that the pupæ of the other lepidoptera, several of them equalling this in size, pass the winter, some in cocoons elevated above the ground, others upon the surface, others slightly under the surface, where they one and all become congealed by the winter's cold without impairing their vitality. I am therefore led to conclude that the repeated instances in which I have met with this pupa lying but a few inches within the loose surface soil were not abnormal, but that this is the depth to which it is commonly buried; and that previous accounts, which represent it as lying deep in the ground, beyond the reach of the frost, are erroneous. When the

warmth of spring has penetrated the earth sufficiently to quicken it again into life, its internal parts continue their growth and development, until the perfect insect becomes formed within the pupa shell. This shell then cracks open and the moth withdraws itself from it, crowds its way upward through the ground, and comes forth in its perfect form.

We next proceed to describe this insect in its different states.

The **MOTH** or perfect insect (Plate 4, fig. 1, is densely coated over with hairs and scales, wholly hiding the surface of the body from view. Its dimensions vary in the two sexes—the body of the female being somewhat shorter and more thick than that of the male. The former usually measures two inches in length, the latter a quarter of an inch more. Its width from tip to tip of the extended wings is much the same in both sexes—seldom varying but a trifle from four inches and a half.

The **HEAD** is pale gray with a brown spot upon each side forward of the eye. The eyes are large and protuberant. The palpi are large and appressed to the under side of the head, with their ends projecting forward and forming a bluntly-rounded apex to the head. The long spiral tongue is glossy, yellowish brown, with its basal portion black on each side. The antennæ are almost half the length of the body, and somewhat shorter in the female than in the male. They are brown, and on the exterior side hoary gray. They are nearly straight, and of a thick clumsy appearance, increasing in thickness very slightly and gradually from the base almost to the tip, and then rapidly taper into a sharp point, which is curved backward. In the males they have along the two flattened faces of their inner side a fine fringe of short hairs placed at the end of each joint.

The **THORAX** is gray, and in front is crossed by two curved black lines meeting at their ends, forming the outline of a crescent having its convex side forward. And on each side of the middle are two black lines parallel with each other through most of their length, extending backward and outward along the edges of the shoulder cover. The hind part of the thorax is brown, with a large black spot upon each side—each of these black spots having on its fore side a roundish blue gray spot, which is edged anteriorly with a transverse line of white or sky-blue hairs. The sides are pale gray, with a brown streak extending from the eye backward to the under side of the wing socket.

The **ABDOMEN** has the form of a cone nearly three times as long as thick. In the males it is composed of seven rings—the last ones becoming gradually shorter, and ending in two compressed tufts of hair, which are of a broad elliptical form, and tapering to a point at their ends. In the females the abdomen is plainly shorter and thicker, composed of but six rings—the last one larger than that which precedes it, and ending in a crown of hairs forming a short cylindrical brush. On the back it is of a gray color, with a slender black stripe along the middle, a white band at the base, and a row of white spots along each side placed in the sutures—the opposite spots being in some instances prolonged into each other, and thus forming a white band upon each suture. Upon the sides the ground color is coal black—this color being notched into at the sutures by the above mentioned row of

TOBACCO-WORM. THE MOTH. ITS LEGS. PRELIMINARY REMARKS ON THE WINGS.

white spots along its upper side, and more deeply along its lower side by a similar row of larger white spots; and on the middle of each of the five first rings is a large round spot of a bright ochre yellow color—the hind ones smaller. The under side is pale gray, with a row of round black spots along the middle, from three to five in number—the second one being the largest.

The LEGS are gray, paler on their undersides, the feet becoming brown towards their tips, with white rings on the joints. The middle and hind shanks have a pair of spurs at their tips on the underside, and the hind ones have a second pair placed a short distance above the first. These spurs are gray, with naked brown shining thorn-like tips, one spur of each pair being longer than its mate. The feet are five-jointed, the first joint being much the longest, and the following ones successively shorter, with a pair of sharp hooks at the end. On their undersides are rows of small black or brown prickles, with a crown of larger ones at the apex of each joint, and along the hindside of the forward feet and shanks is a series of much larger ones.

Preliminary to our description of the wings of this moth the reader should be apprised of some generalities respecting the markings of the wings in the insects of this order. In the immensely numerous group which in common language we designate as millers or moths, and which are scientifically termed the Crepuscular and Nocturnal Lepidoptera, an almost endless diversity in the spots and marks upon the fore wings is met with. Upon looking them over, one after another, no one will suspect there is any system, any uniformity, to these spots and marks, except it may be here and there among the individuals of a particular genus or tribe. And yet, when we come to inspect them more particularly, we shall discover that the same general designs are repeated, the same pattern is copied, more or less completely and distinctly, all through this vast series of objects, it being variations only in the minor details of the figures, as to their particular form, size, colors and distinctness, that make up the wonderful diversity which exists. These markings, which are common to the wings of such numbers of these moths, are situated and designated as follows: First, between the centre of the wings and its outer margin we observe sometimes one but more commonly two small spots of a peculiar aspect. These are called the stigmas or stigmata, this name stigma having been anciently given to a mark burned with a hot iron upon the foreheads of slaves who had been convicted of theft or other crime. Second, extending across the middle of the wing and between the two stigmas is frequently a darker cloudiness, which has been termed the median shade. Finally, the wing is also crossed by three bands, bars or strigæ, as they are differently termed by different writers; first, the anterior, extra-basal or sub-basal, which is placed immediately forward of the anterior stigma; second, the post-medial or elbowed band, immediately back of the posterior stigma; and third, the sub-terminal, sub-apical or penultimate, which is usually more slender and distinct than either of the others and is parallel with and a short space forward of the hind margin. In the moth which is now before us the spots and marks upon the

fore wings appear to have been regarded by previous writers as being so confused and obscure that they have attempted to give no full description of them. Yet we here find the same series of bands extending across the wings as are mentioned above, though portions of some of them are so modified, so faint and irregular, that they can be satisfactorily made out only in specimens which are most perfect, and by an eye that is well exercised in tracing the very obscure marks which so frequently occur upon the wings of this order of insects.

The Wings are long and narrow, the hind ones twice and the forward ones nearly thrice as long as broad. They are traversed by strong longitudinal veins, of which there are eight in number ending in the hind margin of each wing and running nearly parallel and equidistant from each other. The upper wings are gray with a large faint brown cloud occupying the disk and apex. Two bands, each formed of three parallel brown or blackish lines extend across these wings, very irregularly, the one before, the other behind the middle. The anterior band we describe as follows. On the inner margin towards the base are three parallel lines, usually very distinct, running obliquely backward and outward half way across the wing to the anterior end of the brown cloud, each line being turned abruptly forward and forming an acute angular point upon the seventh one of the eight longitudinal veins. Beyond this, these lines become very obscurely traced, only one or two of them being dimly perceptible, extending along the outer side of the anterior end of the brown cloud, till they nearly reach the small stigma spot, where they again turn obliquely forward and outward, here becoming more distinct for a short distance on the inner side of the first vein, across which they are continued in three very oblique streaks to the outer margin, the anterior one ending about opposite to its commencement on the inner margin. The stigma is a very small egg-shaped spot, placed obliquely, with its smaller end towards the inner base of the wing, its centre gray and no paler than the ground color around it, it being in most instances marked only by the dusky ring around its margin. The three lines forming the post-medial band commence near the middle of the inner margin, the two anterior lines running backwards parallel with the inner margin, till they reach the inner vein of the wing, between which and the next vein they each form a mark shaped like an arrow-head, at a considerable distance apart. They then pass upon the brown cloud which occupies the central portion of the wing, where they are widened into two broad, dusky streaks, which are cloud-like and obscure, running obliquely and nearly parallel with the hind margin until they reach the fourth vein, where they abruptly turn to a transverse direction and extend onward to the margin at right angles therewith, these lines being formed of confluent arrow-headed spots, which are more distinct in the anterior line, particularly at its outer end. The third line of this band extends across the wing parallel with the second one, the space between them being grayish, this color forming three or four pale cloud-like spots on the inner side of the middle of the wing occupying the angles formed by the arrow-heads composing this portion of the second line. Where this third line crosses the

inner vein it juts backward, forming a very acute angle, as it does also in a less degree in crossing most of the other veins. Extending across the three lines of the post-medial band, in the space between the third and fourth veins, are two very slender black lines, which are united at their ends, forming a very narrow, elongated ellipsis, its anterior end very acute and reaching almost to the stigma. And parallel with this on its inner side, in the space between the fourth and fifth veins is a similar ellipsis, which is less than half the size of the outer one. These ellipses sometimes appear merely as gray streaks, the black lines along their edges being obsolete, that along the outer edge of the outer one being most prominent and near its forward end widened into a small oval spot. Forward of the hind margin is a coal black line, the sub-terminal, the most distinct and conspicuous of all the marks upon the wings. It is waved towards its inner end, conforming to corresponding but more slight curvatures of the third line of the post-medial band, with which line it is parallel through its whole length, a narrow brown space intervening between them. It is frequently deflected forward as it crosses the fourth vein, and it here terminates in the hind end of the elongated ellipsis. Behind this line, extending along the border of the wing near its extreme edge, is a white line, the space between it and the black line being clouded with bluish gray. Finally, upon the brown ground at the apex of the wing is an oblique coal black line, extending from tip forward and inward to the post-medial band, where it ends between the second and third veins. Its hinder portion is margined on the outer side by a pale streak, and where it crosses the second vein it curves forward and forms an acute angle. The fringe is short and brown, alternated with small gray spots placed half way between the ends of the veins.

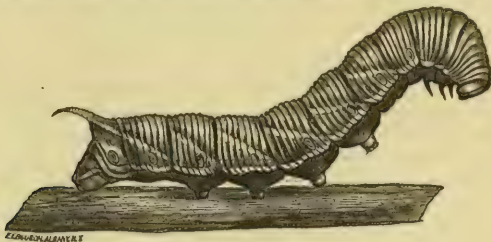
The under wings are blackish at their base, and have a broad, gray hind border, all their middle portion being dull white, and crossed by four black bands. The anterior band is curved, and is commonly united with the second band inside of the middle, and again at its inner end. The second and third bands are parallel or slightly recede from each other towards their outer ends, their inner ends being usually curved almost to a half circle, with the concave side facing forward, the second band being widened and often becoming double in the middle of its curvature. Through the remainder of their length these bands are zig-zag or composed of arrow heads united at their ends, which form acute points projecting backward upon each of the veins. The fourth band is broader than the others, but towards its inner end it tapers and gradually becomes slender, its outer end being curved forward. It is parallel with the hind margin, and forms a border to the gray color of the hind part of the wing. The fringe is short, and of a brown color alternated with white, and becoming wholly white at the inner angle.

On their undersides their upper wings are dull brownish gray, more clear gray along the outer border, and are crossed in their middle by two obscure dusky bands, sometimes with a third band very dimly perceptible between them. These bands, as is particularly obvious in the hind one, are

TOBACCO-WORM. THE WORM DESCRIBED.

formed of a series of curves on the spaces between the veins, with their ends turned backward and forming angles upon the veins; and at the tips of these wings is a black oblique line, corresponding with that upon the upper side, but much more slender and simple. The hind wings are gray, with their hind border down, and are crossed by two blackish bands, which are repetitions of the two middle bands of the upper surface, but more dim, more slender, and running back upon the veins in longer and sharper points.

The LARVA grows to the thickness of one's little finger, and is somewhat over three inches in length or three and a half inches when it is crawling, it being then more elongated than when at rest. Its surface is destitute of hairs or bristles. It is divided into thirteen segments, those at each end



Tobacco Worm.

being shorter and less distinct. The surface of each segment of the body is crossed transversely by impressed lines and roundly elevated intervening spaces, giving them a ribbed appearance, there being eight of these elevated ribs to each segment. In viewing this larva the eye first of all notices a formidable looking, stout, thorn-like horn, placed at the hind end of the back, and projecting obliquely upward and backward, about as long as the segment which is next forward of it, slightly curved, and its surface rough from little projecting points. Low down upon each side is a row of large oval dots, which are the spiracles or breathing pores. The head is small, horny and shining, of a flattened spherical form, and the mouth furnished with a pair of stout jaws. It has three pairs of small tapering feet placed anteriorly upon the breast, each having a sharp hook at its end, and four pairs of short, thick, fleshy pro-legs along the underside of the body, with two similar ones at the tip.

The color of this worm is commonly bright green marked with white. Numerous faint whitish dots are usually perceptible, at least on the fore-part and underside of its body, and along each side are seven straight oblique stripes, the last one of which is prolonged more or less distinctly to the base of the curved horn. These stripes are usually margined along their upper sides by a faint dusky cloudiness; and meeting their lower ends is a longitudinal stripe, placed low down upon each segment, and forming with the oblique stripe, a V-shaped mark, having its point directed forward, with the breathing pore placed in the angle which is thus formed. The hindmost breathing pore also has a much shorter and more faint white stripe

TOBACCO-WORM. VARIES GREATLY IN COLOR. THE PUPA DESCRIBED.

on its upper and another on its lower side, the two stripes uniting together forward of it; and at the anterior end a faint white streak is commonly visible for a short distance forward of the lower end of the first oblique stripe. At the hind end of the body is a flattened triangular space which is margined with white upon each side. The head is green, sometimes with a vertical black streak upon each side. The anterior legs are dusky towards their tips, and on their inner sides are a few small black bristles. The soles of the pro-legs are black, as is also the curved horn at the end of the back.

This larva is liable to vary in its colors to a surprising extent. Many persons from noticing in their gardens worms which are so totally dissimilar in their colors confidently suppose there are two or three different species of them infesting their tomatoes. And the same varieties occur upon the potato, and probably also upon tobacco. Its most common color is leek green. From this it varies to lighter yellowish green, and on the other hand to various shades of darker brownish and blackish green. In other instances the green color wholly vanishes, and the worm is pale or deep amber brown, blackish brown, purplish black or pure black. In these brown and black varieties the head sometimes retains its normal green color, but is usually the same color with the body. The dots upon the skin and the oblique stripes along the sides are very often light yellow instead of white; and where the ground color of the worm is dark brown or black, these markings are always yellow, or sometimes pale pink red. The breathing pores are black, but sometimes dark red or dull yellow, and are surrounded by a ring of white or pale blue, which is usually inclosed in a second ring which is sometimes brown, sometimes black. The curved tail-like horn, so far as my observation goes, is the only part which is constant in its color, this being always black.

The Pupa or chrysalis is of an oval form, its opposite sides nearly parallel through most of its length, and tapering at each end. It is four times as long as thick, its length being two to two and a half inches. It is of a chestnut brown color, paler in some places and blackish in others. The anterior end is irregularly narrowed and at its apex is prolonged into a remarkable



Tobacco-worm Pupa.

ly long cylindrical tongue-case the thickness of a coarse knitting-needle, which projects downward and is curved backward at a distance of nearly a fourth of an inch from the surface of the breast, becoming straight through the last half of its length and reaching half the length of the body. It is thickened and bluntly rounded at its end, which slightly touches the surface of the body and is firmly soldered thereto. It is evenly ribbed transversely, appearing as though the enclosed tongue were divided into a number of short joints like the antennæ, and along its outer and its inner sides are two elevated lines extending its whole length. The wing-sheaths are smooth and glossy, with faint elevated lines marking the veins of the inclosed wings. They are firmly soldered

TOBACCO-WORM. KILLED BY INTERNAL PARASITES. THEIR HABITS.

to the body, and reach two-thirds of its length, and interposed between them at their ends is a single pair of the leg-sheaths, which exactly equal them in length. Along their lower edges are the antennæ-sheaths, regularly marked with transverse impressed lines, and tapering to a very acute point on each side of the end of the tongue-case. The rings of the body are closely and confluent punctured on their anterior sides and show numerous transverse irregular scratches and fine wrinkles towards their posterior edges. The breathing pores form a row of oval impressions along each side, each having two acutely elevated lines and between them a narrow elliptic cleft. On the back at the base of the abdomen is a smooth black transverse ridge interrupted in its middle. The three short rings at the hind end are rapidly narrowed, forming a conical point having at its tip two small thorn-like points, one larger than the other.

We come in the next place to consider the natural enemies and destroyers which restrain this insect from becoming excessively multiplied and numerous. Large and vigorous as this tobacco-worm is, enveloped in such a tough, leathery skin, and jerking its body about with the force and spitefulness it does when anything molests it, we should scarcely suppose any other creature would care to encounter it. And yet it finds its mortal foe in a little four winged fly, scarcely a thousandth part of its size. It is truly wonderful that such a pigmy as is this fly is able to attack and destroy such an elephant as is this worm. The fly alights upon the worm, and with the short sting or ovipositor with which it is furnished pierces its skin and inserts a minute egg in the puncture. It continues to repeat this operation at one point and another upon the back and sides of the worm, until its whole stock of eggs, amounting to a hundred or more, is exhausted. These eggs hatch minute maggots, which distribute themselves all through the body of the worm, feeding upon its fatty substance, but without attacking any of its vital parts. And thus the worm continues industriously to feed and elaborate nourishment for feasting and pampering these greedy parasites which are luxuriously rioting within it. If a worm which is thus infested be cut into, it appears to be everywhere filled with these little fat maggots. When they have got their growth they gnaw out through the skin, but instead of dropping to the ground and there secreting themselves as they would be expected to do, they still cling to the unfortunate worm, each maggot spinning for itself a little oval white cocoon, one end of which it fastens to the skin of the worm at the orifice where it has issued from it. Thus the worm comes to present the remarkable spectacle of being clothed, as it were, with a hundred or more of these cocoons, resembling little white seeds like kernels of rice adhering to and in places wholly covering its back and sides. I have counted one hundred and twenty-four of these cocoons upon a single worm, and a still larger number will probably be found in some instances.

These parasitic cocoons are milk white and of a regular oval form, 0.15 long and 0.06 broad. Their walls are no thicker than thin writing paper but are very dense and firm. Their surface is minutely uneven, with a few loose, wrinkled threads at one end, whereby they are held to the skin of

TOBACCO-WORM. PARASITE DESCRIBED. ITS HEAD. ITS BODY.

the worm, yet so slightly that they are liable to be detached by the slightest force, some of them falling off, sometimes, merely from the motions of the worm.

When these parasites issue from it the worm has become so weakened and exhausted that it ceases feeding and moving about, and in about three days afterwards all traces of its vitality have vanished. The multitude of minute hooks with which the soles of its pro-legs are furnished, however, continue to hold the dead worm to the stalk of the plant, with its head hanging downwards and its body shrunken and flaccid from the evaporation of its fluids, until some agitation of the plant by the winds or other violence detaches it and it falls to the ground.

In the meantime the parasites change to pupæ, and after remaining in the cocoons seven days they come out from them in their perfect form. The flies are black, with clear transparent wings, and legs of a bright tawny yellow color, the hue of bees-wax, with the hind feet and the tips of the hind shanks dusky. They belong to the order HYMENOPTERA, and to that group of the Ichneumon-flies, which in works of science have been termed *Ichneumonides adsciti* or the family BRACONIDÆ. Several of the species of this family present the singular character of having the eyes pubescent, numerous fine short erect hairs arising from their surface. These pertain to a particular genus which has received the name *Microgaster*, from two Greek words, equivalent to our English term "small-bellied." It is to this genus that these parasites of the Tobacco-worm belong. And they were described by Mr. Say, in a posthumous paper which was published in the year 1835, in the Boston Journal of Natural History, vol. i, p. 262, under the name *Microgaster congregata* or the Congregated Microgaster, in allusion to their young being found together in such numbers upon a single worm.

The TOBACCO-WORM PARASITE, *Microgaster congregata*, is of a coal black color and 0.14 long when living. After death it contracts in drying and is then scarcely 0.12 in length, and the male is a size smaller, not exceeding 0.10. Its head is spherioid, or of a flattened globular form, with the antennæ inserted in the middle of the front side. The antennæ are coarse, thread-like, and longer than the body in the male, shorter in the female. They are composed of about seventeen joints so closely connected that their articulations are difficult to perceive. The joints gradually become slightly shorter and less thick as they approach the tips. The palpi and jaws are white. The eyes are distant from each other on the sides of the head, and in a strong light their surface is seen to be closely bearded over with minute short hairs. Between them on the crown the eyelets or ocelli appear as three small glassy dots placed at the corners of a triangle. The thorax is the broadest part of the body. It is egg-shaped, its surface minutely and closely punctured, and back of the middle it is crossed by a deep groove. The abdomen is oblong oval, and about the same length as the thorax. It is smooth and shining, except the two first segments which are rough from obscure shallow punctures, with an elevated longitudinal line in the middle. On its underside the three first segments are pale yellow, with a dusky

spot on the middle of each, that on the third segment being large, and as the sutures contract in drying these spots become united. At its tip the abdomen in the female is compressed and vertically truncated, with the sting forming a conspicuous projecting point at the lower end of the truncation. In the male the tip is rounded and without any projecting point, though when living it may sometimes be seen to protrude two styles or slender cylindrical processes pointed at their tips, and between these a thicker process from the apex of which a fine bristle is occasionally thrust out. The *legs* are bright tawny yellow, becoming more dull and pale in the dried specimen. The hind feet and tips of the hind shanks are smoky or blackish. The hind thighs are also blackish at their tips, and frequently show a dusky line along their upper sides, extending nearly to the base. The *wings* are hyaline, glassy and iridescent. The forward pair have the stigma appearing as a large, opaque, triangular, brownish black spot on their outer side slightly beyond the middle. The rib or marginal vein is thick and brownish black, becoming paler brown towards its base. The basal portion of the wing is traversed by two pale longitudinal veins, which are parallel, the outer one straight, the inner one curved towards its base. The outer vein sends off a long and nearly straight branch obliquely outward and backward to the anterior end of the stigma, this branch bounding the discoidal and the first cubital cells on their fore sides. The discoidal cell is triangular, with the vein on its inner side brown and angularly bent at one-third and again at two-thirds of its length, giving off at each of these angles a short oblique veinlet, the first one of which is brown and the other colorless. The first cubital cell is of the same size with the discoidal, and is irregularly six-sided, the anterior and the inner sides being quite short; and the veinlet bounding this cell posteriorly is thick and brownish black, the inner half of its length being oblique and the outer half transverse, ending in the inner angle of the stigma. Beyond this, traversing the apical third of the wing are three longitudinal veins, which are very slender and colorless. The middle one of these veins is abruptly thickened and blackish brown for a very short distance at its base, this thickened portion forming, with the oblique inner end of the veinlet last described, two of the sides of the small triangular cellule which is common in the wings of the insects of this genus and family, but the short veinlet which should complete the enclosure of this cellule on its hind side, is wholly wanting.

Mr. Say is wholly silent respecting the interesting habits of this insect, merely remarking that he obtained eighty-four of the flies from the larva of a *Sphinx* in the month of June. As I have had the flies come from the cocoons in July and also in September, it is probable that they are abroad upon the wing during the whole summer season, actively searching for suitable worms to inoculate with their eggs. As will be seen from a statement in one of the following pages, this parasite does not appear to be limited to the tobacco-worm, but preys upon the larvæ of other species of *Sphinx* also. And some of our other species of *Microgaster* have the same habit of fastening their cocoons to the larvæ from which they respectively

TOBACCO-WORM. PARASITE'S COCOONS MISTAKEN FOR EGGS. ITS RAPID INCREASE.

issue. It is not rare, therefore, to meet with a worm which is thus burthened and shackled; and they are justly regarded as great curiosities. Correspondents have frequently sent me examples of this kind; some of them supposing in the fullest confidence that the little cocoons adhering to the back of the worm were eggs which the worm had laid, thus demonstrating, as it was thought, that the statements made in these Reports were erroneous, that it is only in their perfect and never in their larva state that insects produce eggs. This is an error into which every one who is not acquainted with insects and their wonderful habits and transformations will be very apt to fall, the shape, color and size of these cocoons being so much like eggs which a large worm like this might be expected to generate. And it shows in a strong light how important it is that our population should be correctly informed and measurably intelligent in this science. For a person destroying one of these worms will be particularly careful to also destroy all these supposed eggs; deeming that in each one of them he in effect destroys another worm; instead of which he hereby protects and insures the upgrowth of another worm—thus doing the very thing which he is aiming to prevent.

Of the hundred flies which are bred from one of these Ichneumonized tobacco-worms, we may assume that fifty at least will on an average be females, to destroy fifty more worms. We thus see what efficient agents these insects are in checking the increase of this moth, and what an important service they hereby render us. Indeed, when we recur to the fact that these parasites attain their growth in a space of time so very much shorter than does the tobacco-worm, whereby there is probably two generations of them to one of the latter, it will appear that the parasites issuing from a single Ichneumonized worm will suffice to destroy two thousand and five hundred other worms within the time that one brood of these worms is growing up to maturity. They would therefore speedily exterminate these worms from existence, were they permitted to go on multiplying themselves without any check. And they are so well secreted and protected that there would seem to be little risk of their being discovered and destroyed by any enemy. For during their larva state, when they are soft and tender and without feet or any other means of defence or escape, they are lodged within the body of the tobacco-worm where they are secure from harm; and when they issue therefrom they immediately enclose themselves in tough paper-like cocoons, in which they lie hid until they have acquired wings wherewith to fly away from any danger which menaces them. Thus they would seem to be protected and safe from injury. Yet the artifice of enclosing themselves in cocoons fails to procure them immunity. Another minute insect has been created and endowed with the sagacity to discover them in the little pods in which they hide themselves, and there this creature metes out to them the same treatment which the tobacco-worm receives from them. Thus the tobacco-worm does not die unavenged. The lingering, miserable death which it has suffered, its enemies, as if by an act of retributive justice, are doomed to undergo in their turn.

TOBACCO-WORM. A DESTROYER OF THE PARASITE DISCOVERED.

On one occasion, when I was contemplating one of the tobacco-worms which I met with covered over with parasitic cocoons, I noticed a very small fly wandering about among the cocoons. My first thought was that this fly was probably one of the *Microgaster* parasites which had just then come from some one of these cocoons ; but the query soon arose in my mind, whether it might not be an enemy, stinging the cocoons to destroy their inmates in the same manner they had destroyed the tobacco-worm. Its very small size did not enable the eye to discover whether it really was one of the *Microgaster* flies. I was so fortunate as to succeed in enclosing it in a small vial, and then upon examining it with a magnifier, I became assured it had not come from the cocoons, for I perceived it pertained to a different group of parasites from that to which the *Microgaster* genus belongs. But how could the highly interesting and important point be ascertained, whether it actually was a destroyer of the inmates of these cocoons? With the hope of obtaining further light upon this subject a portion of the stalk of the plant with the tobacco-worm adhering to it was cut off and enclosed in a glass jar. On the fifth day thereafter, two *Microgaster* flies made their appearance in the jar, and the worm now being dead and beginning to become putrid, the cocoons were all removed from its surface and enclosed in a vial. It was feared that this slight violence to them had destroyed their inmates, as day after day now elapsed and no more flies came from them. But, three months later, in December, they being kept in a warm room, a dozen flies were discovered, wandering around in this vial ; and for some weeks after, others continued to come forth from the cocoons. And these proved to be identical with the single fly which had been captured among these cocoons so long a time before. It was therefore evident that that fly was the parent of these which were now issuing from the cocoons ; and so industrious had that little creature been, that it had punctured and dropped one of its eggs into all save two of the cocoons, which were more than a hundred in number ; and these two, it is probable, would not have escaped, if the fly had not been interrupted and taken away from its work.

These destroyers of the insect which destroys the tobacco-worm are very small four-winged flies of a shining dark green color, with pale yellowish legs and white feet. They belong to the order HYMENOPTERA and the family CHALCIDIDÆ, and are closely related to the Hessian fly parasite, *Semiotellus destructor*, figured in my Seventh Report, plate 3, fig. 1, which figure will also serve to represent this insect in almost every particular. It pertains to the genus *Pteromalus*, a name derived from two Greek words, meaning bad wings, the wings in these insects being nearly destitute of ribs or veins. As they, by destroying the parasite of the tobacco-worm, cause that worm to be more numerous and hereby more injurious to the tobacco, and as they will often occur lurking about this plant in search of the cocoons upon which to bestow their eggs, they may not inappropriately be named the Tobacco *Pteromalus*. All the flies which came from the cocoons were females, from which the following description is drawn.

The TOBACCO PTEROMALUS (*Pteromalus Tabacum*), is one-tenth of an inch

TOBACCO-WORM. PARASITE'S DESTROYER DESCRIBED.

long to the end of its body, and is of a dark or bottle green color with a brassy reflection, and finely shagreened upon the head and thorax. The head is large and placed transversely, about three times as broad as it is long, convex in front and concave at its base. Viewed in front it is nearly circular, with a large oval eye slightly protruding upon each side, of a dull red color fading to brown after death. On the crown three ocelli or eyelets appear as glassy dots placed at the corners of a triangle. The jaws are yellow, their ends brown, with four minute teeth. The palpi or feelers are dull white. The antennæ are inserted in the middle of the face and when turned backward reach about half the length of the thorax. They become a little thicker towards their tips, and are of a brown color with the long basal joint dull pale yellow, and are clothed with a short incumbent beard. They are composed apparently of nine joints, the first joint being long and smooth, and forming an angle with the remaining joints. The second joint is the smallest of the series, being but little longer than thick and obconic in its form. The third joint is thrice as long and nearly thrice as thick as the preceding, and has the shape of a pear, the contracted portion of its base being formed of two rings or small joints which are rarely perceptible even in the live specimen when highly magnified, except these organs be put upon the stretch. The fourth and following joints are a third shorter than the foregoing, and are nearly equal and square in their outline, each successive joint very slightly increasing in thickness and diminishing in length. The last joint is about thrice as long as the one preceding it, of an oval or sub-ovate form, rounded at its base and bluntly pointed at its apex, and is probably composed as in the other species of this genus of three joints compactly united together. The thorax scarcely equals the head in width and is egg-shaped and thrice as long as wide. On each shoulder is a slightly impressed line extending obliquely backward and inward. The abdomen is a third shorter than the thorax, and in the live insect surpasses it in thickness, is egg-shaped and convex with its tip acute pointed. When dried it scarcely equals the thorax in thickness, and becomes strongly concave on the back and triangular when viewed from one side. It is smooth, polished and sparkling, of a green black color, the middle segments each with a broad purple black band visible in particular reflections of the light. Beneath it is black and at the tip shows some fine impressed longitudinal lines forming the edges of the groove in which the sting is inclosed. The legs are slender, pale wax yellow, with the feet and ends of the shanks dull white, the hips of the hind legs being stout and black, with their outer faces green blue and their tips pale yellow. The feet are five-jointed and dusky at their tips. The wings are transparent and reach slightly beyond the tip of the abdomen when at rest. The anterior ones are broad and evenly rounded at their ends, and have, near the outer margin, a thick brown rib or subcostal vein extending more than a third of their length and then uniting with the margin and terminating some distance forward of the tip, after sending off a short straight stigmal branch which is thickened at its end, with its apex notched. Towards the inner margin an exceedingly fine longitu-

dinal vein is perceptible, which, near its middle, gives off a branch running almost to the inner hind end of the wing. The hind wings are much smaller and without veins, except a brown subcostal one, which extends into the outer margin and abruptly ends a little beyond the middle.

All the examples of this species, which I have obtained from cocoons upon the Tobacco-worm, have been females. The last of August, 1862, I received from Dr. Allen of Saratoga Springs, a larva of the *Sphinx Kalmie* to which thirty-six cocoons were adhering. And the middle of July, the following year, H. Markham, Esq., of Stony Brook, Long Island, sent me the same larva, similarly infested. It may here be incidently observed that both these gentlemen met with these larvæ upon the leaves of the grape-vine. As I have repeatedly observed it, in different years, upon the lilac, the leaves of which are certainly its usual food, the interesting query arises, whether, when it is infested internally with parasites, they do not cause a morbid appetite in the worm, whereby it ceases to relish its natural food and comes to crave the leaves of the grape in place of those of the lilac? Flies were obtained from more than half the cocoons upon the first mentioned worm, and these being all of one species, I supposed they were probably the true parasites of the Lilac-worm. But I now find on comparing them, that they are identical with this species which is now under consideration. It thus appears that the cocoons adhering to the Lilac-worm had been formed by a species of *Microgaster*, probably this same species which infests the Tobacco-worm, and that the flies I obtained were its parasites and consequently were protectors instead of destroyers of the Lilac-worm. The cocoons from Mr. Markham, might perhaps have given more light upon this subject, and I now regret that, when they came to hand, supposing they would only produce the same flies which I had examined the preceding summer, I felt that it would be a waste of time to attend to the rearing of their inmates.

Of the flies obtained from the Lilac-worm, four were males, whereby it appears that this sex differs from the females above described, in the following particulars: 1st, their color is lighter and more bright, being brilliant metallic green, when dried becoming blue green; 2d, their antennæ are tarnished yellow, longer, and not at all thickened toward the tips, their joints being cylindric and a third longer than thick, with the last joint egg-shaped and but little longer than its predecessor; 3d, the abdomen is flattened oval and rounding at its tip, with a large translucent pale yellow spot near the base; 4th, the legs are paler and pure yellow without any mixture of orange or tawny.

One who is acquainted with this insect and the *Microgaster* fly, will readily distinguish them by their motions, notwithstanding their smallness and similarity in size. The *Microgaster* is very brisk and active in its movements, running about with agility and flying away if any danger menaces it. This insect on the other hand, appears tame and sedate, walking around slowly, and as if with deliberation as to what it is doing; and if any annoyance approaches it, to escape therefrom it gives a slight skip, throwing itself about an inch, and repeating this leap again and again if pursued, it being not at all inclined to take wing.

TOBACCO-WORM. HAS A SECOND PARASITE. REMEDIES.

And after these flies have left their cocoons, it is readily told by the appearance of each cocoon, whether it is a *Microgaster* or a *Pteromalus* fly which has come out from it. The *Microgaster*, by which all the cocoons are constructed, makes an opening for its escape in a more neat and artistic manner than does its destroyer. When it passes from its pupa state and awakens to life in its perfect form, it finds itself closely pent up within its narrow cell — so closely that about the only motion it is able to make is to turn its head from side to side. And it discovers that by grasping with its jaws the wall of its cell, it is hereby able to gradually roll itself over in its bed. And now, with the minute sharp teeth at the ends of its jaws, it cuts a slit transversely through the wall of its cell, lengthening this slit more and more as it gradually turns itself around. Thus it cuts the end of its cocoon smoothly off in the form of a little lid, a few unsevered fibres being left on one side, which serve as a hinge to hold this lid in its place. The inclosed fly then pressing its head against this lid raises it up and crawls forth from its prison. Thus the evacuated cocoon has its end smoothly cut off, with the severed portion usually adhering to it. The *Pteromalus* fly, on the other hand, being a size smaller, is able to move about and can probably turn itself around inside of the cocoon. And to make its escape it gnaws a hole through the side near one end, of sufficient size for its body to pass through; this hole in different instances being round, oval, or irregular, and its edges ragged and uneven.

In addition to the eggs of the *Microgaster*, which are inserted under the skin of the Tobacco-worm and thus are not visible externally, I have occasionally met with a worm having one or more eggs glued upon its surface, usually placed in a crease of the skin to render the attachment to it more secure. These eggs are about three-hundredths of an inch long and a third as thick, oval, white, smooth and glossy like enamel. Within them a minute soft white worm or maggot becomes formed, which is hatched by gnawing through the shell of the egg at one end, and as it is coming out, it sinks itself downward through the skin of the worm and into its body, a blackish dot upon the skin near the end of the empty egg marking the point where it has entered. Its history I have not been able to trace further than this. The facts show it to be another parasite destroying the Tobacco worm, and that it is probably a two-winged fly belonging to the order DIPTERA.

The remedies for this insect are remaining to be spoken of. But as we have had no personal experience in combatting it, it will not be expected that we dwell upon this branch of the subject at any length.

The leaves of the potato and tomato being of no value, the presence of this worm upon them is wholly disregarded, as its limited numbers never consume the foliage to such an extent as to perceptibly diminish the growth of the tubers in the one or of the fruit in the other of the plants. But with the tobacco it is very different. The whole value of this plant depends upon its leaves; consequently every morsel which this worm consumes from them is a loss, and if the leaves are much eaten the loss is great. The utmost vigilance is therefore required to save the tobacco from injury from

POTATO-BEETLE. ITS LOCALITIES. ITS NAME.

this enemy. At the South, where they have had long and sore experience with the twin sister of our insect, the only remedy found to be effectual is searching out and destroying the worms. This "worming" of the tobacco fields, as it is termed, is an indispensable measure, forming a regular part of the tobacco culture. After the leaves are grown to a sufficient size for the worm to begin to feed upon them, not a day is suffered to pass without examining them. The leaves are so large and so very tender and brittle, except for a short period at mid-day, when they become pliant from being somewhat wilted by the heat of the sun, that the utmost care is requisite in passing among them to avoid breaking and tearing them. Notwithstanding the closest scrutiny some of the worms will be overlooked, at each search which is made. Moreover, new moths are coming out and depositing their eggs day after day, whereby a succession of worms are appearing. Thus it becomes necessary to repeat this examination daily, searching out and destroying every worm while it is yet young and small.

When these ugly looking worms first began to be noticed upon the tomatoes in our gardens, some sensitive persons were much alarmed with fears that they were poisonous and would render the fruit deleterious if they happened to touch or crawl over it. But such fears are wholly groundless. The sharp, thorn-like tail of this worm, however, if it chances to penetrate the skin, inflicts a painful wound. This is the only thing to be guarded against.

10. TEN-LINED POTATO-BEETLE, *Doryphora 10-lineata*, Say. (Coloptera. Chrysomelidæ.) Plate 4, figure 6.

Eating the leaves of the potato in immense numbers through the whole summer; a thick, oval beetle nearly half an inch long, and of a pale yellow color with five black stripes on each wing cover, accompanied by its thick-bodied, worm-like larva of a pale yellow color with rows of black dots, and six legs upon its breast and a pro-leg at the pointed end of its body.

In connection with the foregoing potato-worm, some account may here be given of a new enemy which, within the past two or three years, has fallen upon the potato-vines in numerous places all over the Northwestern States, stripping them of every vestige of their foliage and eating the stalks also, and hereby arresting the formation and growth of the tubers. Specimens of this insect are being frequently sent me for information respecting it, whereby I am able to present a description of it in its different stages of life and several important facts respecting it. Fortunately for us, it is not an inhabitant of our State, being found only in the valley of the Mississippi at a distance from our borders.

This insect was first discovered as being common on the Upper Missouri, by Mr. Say, when accompanying Long's Exploring Expedition to the Rocky Mountains. He met with it upon the Arkansas river also. In 1823, he published a description of it (Journal of the Academy of Natural Sciences, vol. iii., p. 453), naming it from the number of the stripes upon its wing-covers, *Doryphora 10-lineata* or the Ten-lined Doryphora—this genus having been separated from the old genus *Chrysomela*, by Illiger, to include a number of South American species which have the middle portion of the

breast prolonged into a horn-like point, wherefore the name ; *Doryphorus* being a Greek word meaning a spear-bearer, and particularly memorable as the name of one of the most celebrated statues of the sculptor Polyclethus. But our insect and a few other species of this genus are destitute of the sharp, thorny point alluded to. Chevrolat, in Dejean's Catalogue, proposed to form these into a distinct genus, named *Polygramma*—i. e., many-lined. But this step has not been approved of by subsequent authors.

The year after Say described this insect, the distinguished German entomologist Germar also published it, under the name *Dyrophora juncta*, which, of course, will be merely a synonym of the anterior name.

The first notice of this as being an injurious insect, appears in the *Prairie Farmer* of August 29th, 1861 (vol. viii., p. 116), in a letter from J. Edgerton, of Gravity, Iowa, saying that "they made their appearance upon the vines as soon as the potatoes were out of the ground, and there being a cold, wet spell of weather about that time, they devoured them as fast as they were up." They appeared most fond of the Prince Albert variety, doing but little injury to several other kinds. Several generations appeared to grow up in the course of the summer. The specimens were sent to D. Thomas, Esq., of Marion, Williamson county, Ill., who in reply announces them to be the species above named, and says that this same insect "is found in abundance in Southern Illinois ; but so far I have only discovered it on worthless weeds and low shrubs ; and here it has not proved injurious to useful vegetation," wherefore he thinks it is only accidental that it has fallen upon the potatoes in Mr. Edgerton's vicinity, and that some peculiarity of the plants, state of the atmosphere, or other influence may next year cause it to forsake the potato and take up its residence upon some other plant.

The next year, Thomas Murphy, of Atchison, Kansas, sent a number of the beetles to the *Valley Farmer*, with an accompanying letter, published in that periodical July, 1862 (vol. xiv., p. 209), saying that in August, 1861, "soon after a heavy shower of rain, these bugs suddenly made their appearance in large numbers on the potato vines. They were so numerous that in many instances they would almost cover the whole vine. It is no exaggeration when I tell you that we have often, in a very short time, gathered as many as two bushels of them. When the cold weather set in they disappeared. Early this spring I was setting out some apple trees, and away down in the hard yellow clay, I found these bugs apparently dead, but put them in the sun and they immediately came to life. They have again (May 22) made their appearance in large numbers in my garden. Last year they first ate up everything green on the potato vines, then commenced on the tomatoes, and so on, on everything green. Strange to say, they trouble no one else." Some of the beetles had been forwarded to Benj. D. Walsh, Esq., of Rock Island, Illinois, who communicates their name and a good figure, but is singularly unfortunate, not to say erroneous, in several of his statements made in connection with this subject ; for instance, that the New York weevil is "an exclusively western species," "Mr. Murphy's account is the first on record of this beetle occurring in gardens in such

POTATO-BEETLE. ITS EGGS AND LARVA DESCRIBED.

numbers as to be injurious," &c. He regards the fact of Mr. Murphy's finding the beetles under ground in the spring, as full proof that this insect always goes under ground to pass its pupa state; overlooking the additional fact that Mr. M. found these beetles lying dormant and apparently dead, which indicates that no warmth had at that time penetrated the earth sufficient to change them from their pupa to their perfect state. Mr. M's. recital of his observations would seem to make it plain that it is in their perfect, not in their pupa state that they hibernate. He says the beetles were immensely numerous; but when the cold weather set in they disappeared. Early the next spring he again found them away down in the hard yellow clay, apparently dead but immediately reviving when exposed to the sun. And finally, May 22d, they had again made their appearance abroad in large numbers. Everything thus appears to show that these beetles remain abroad in full force until a frosty night cuts off their food and chills them, whereupon they hasten into any crack they can find in the hard clay soil, or under any log or stone lying on the surface. They there become dormant and thus repose through the winter, and with the warmth of returning spring revive and issue from their retreats.

Specimens of this beetle, its eggs and larvæ, we received first from John S. Bowen, Elkhorn city, Nebraska, in May, 1863. Similar remittances have since come to hand from different parts of Iowa. A correspondent at Webster City writes that these insects are "very voracious feeders, not only denuding the vines of every vestige of leaf, but also devouring the stalks. Killing them seems to do no good, they breed so rapidly; and as they fly through the air, they would soon be re-established were they all exterminated from a field. It is now August 1st, and few if any tubers are yet set upon by my potatoes, though the planting was very early." And from New Sharon we are told that some have been discouraged from planting potatoes, the ravages of this potato-bug have been so great.

The beetles though sent from such a great distance have in every instance reached me alive, whilst the larvæ accompanying them have been nearly or quite dead, except in two or three instances. The eggs also uniformly hatch and the young from them perish before they come to hand. Kept in confinement, the beetles usually live so long as they are supplied with food. I have thus kept an individual captured in May, until the frosts of autumn destroyed my supply of potato and tomato leaves. And beetles newly born, if gradually exposed to the cold, will undoubtedly become torpid and dormant, and lying in this state through the winter will revive and return to activity with the return of warm weather.

The female in confinement drops her eggs in little clusters upon the leaves on which she has been feeding. The eggs are bright yellow, smooth and glossy, 0.06 long and 0.035 broad, of an oval form with rounded ends.

The LARVA, when full grown is over a half inch in length and half as thick, being thickest back of the middle and tapering to a point at its tip. It is a thick plump grub, strongly arched above, and when viewed on one

POTATO-BEETLE. THE BEETLE DESCRIBED.

side its outline is nearly the form of a crescent. The head is small and much narrower than the fore part of the body, of a flattened spherical form. Its mouth is furnished with short conical, jointed feelers and large jaws which are blunt at their ends, with little sharp teeth like those of a saw. Immediately above the mouth on each side of the head is a small conical and jointed projection which is the antenna. The thorax has a large transverse space on the top of its first ring, of a firmer and somewhat coriaceous texture and broadly margined with black on its hind side and with dusky at each end. The abdomen is the thickest part of the body and is distinctly divided into nine segments. It is very plump and rounded, but flattened on its underside. It gradually tapers posteriorly into a conical point the apex of which is blunt and serves as a pro-leg, two small vesicular processes on its lower side at the end serving as feet. There are six legs, placed anteriorly, upon the breast, each leg being composed of three joints and ending in a small claw. The larva is of a pale yellow color, often slightly dusky or freckled on the back with minute blackish dots, and along each side are two rows of large black dots, those of the upper row larger, seven in number, not being continued upon the thoracic or the last abdominal rings, each dot having a small breathing pore in its centre. The head is black and shining, and more or less mottled on the face with dull yellowish. The neck or first ring has a black band near its hind edge; the second ring has also either a short black band or two black dots, whilst the third ring usually shows two small black dots on its back. On the narrow tip of the body are two black bands, the anterior one having at its end on each side a small black dot, and beyond this a large black dot which is the last one of the lower row of dots along the sides. On the next ring forward is a transverse row of six small equidistant black dots, in addition to the two large dots on each side, whereof the upper one is the last of the upper lateral row, and the lower the penultimate one of the lower row. The legs are black; and often along the middle of the body, on the underside, is a row of transverse black spots or clouds, and also a row of small black dots upon each side.

The BEETLE or mature insect is 0.40 long and 0.25 thick, the female being slightly larger. It is of a regular oval form, very convex above and flat beneath, of a hard crustaceous texture, smooth and shining, of a bright straw color, the head and thorax being sometimes tawny yellow, which is the color of the underside; and is dotted and marked with black. After death its colors often fade, becoming more dull and dark. The head is nearly spherical and little more than half the width of the thorax, into which it is sunk nearly or quite to the eyes. It is sprinkled over with fine punctures and shows on the front an impressed medial line, and on each side of this a wider shallow indentation. On the crown is a triangular black spot. The nose piece or clypeus, occupying the space between the antennæ, is nearly semicircular and placed transversely, and is coarsely and closely punctured. The jaws are coarsely punctured, black at their tips, and have a slender black line along their outer edge. The tips of the palpi or feelers are dark brown. The antennæ reach nearly to the base

POTATO-BEETLE. THE BEETLE DESCRIBED. REMEDIES.

of the thorax when turned backward. They are gradually thickened towards their tips, twelve-jointed, the last joint being quite small, conical, and sunk into the apex of the preceding joint. The five first joints are pale yellow or tawny, obovate, the basal one largest, and the third one longer than either of the other three. The remaining joints are black and somewhat globular. The *thorax* is transverse, twice as broad as long, broadly notched in front for receiving the head, and its hind side convex. Five punctures are scattered over its surface, these punctures becoming more numerous and coarser towards the outer sides. It is commonly margined all round by a slender black line. In the centre are two oblong black spots which diverge forward. Back of these is a small black dot which is often wanting; and on each side are about six small black spots; one towards the base, of an oval form and placed transversely; and two round ones, nearly upon a line forward of this, the three being equidistant from each other; two towards the hind angle, placed close together and often united, the inner one of these being largest of the six; and the sixth one placed half way between the two last and the forward angle. The scutel is dark brown. The *wing-covers* have the sutural edge dark brown, and five equidistant black stripes on each. The first or inner stripe is shortest and tapers backward as it gradually approaches the suture, terminating in a very long slender point a considerable space forward of the apex. The two next stripes are broadest and are united at their tips, beyond which they are sometimes prolonged into the end of the fourth stripe. The outer stripe is the most slender and longest of all, placed on the outer margin but terminating before it attains the apex. The wing covers are also punctured in rows extending along the margin of the stripes, the rows being uneven and the middle ones double; and the outer interspace is also punctured. *Beneath*, the sockets of the legs are black or edged with black, and on the hind breast is a transverse black spot on each side, forward of the insertion of the hind legs, and also a black stripe on the outer margin of the hind breast, outside of which on the parapleura is a triangular black spot. The abdomen is finely punctured on the disk and base, and has a short black band on the middle of the anterior edge of each segment except the last, and near the outer margin a row of six black dots. The *legs* are tawny yellow, with the hips at least of the hind pair black and also the knees and feet.

Say mentions a variety of this beetle having the wing-covers white. This is probably always their color when recently disclosed from the pupa.

What will be the best remedies for this new insect enemy can only be ascertained by experiments with it in its native haunts when its habits are more fully observed. We know not whether turkeys and other fowls relish these beetles, whereby they may be employed to aid in lessening their numbers. The large size of the beetles and their sluggish movements favor their being readily noticed and picked from off the vines. But their numbers are so immense as to dishearten from attempts to thus get rid of them unless some way can be devised to gather them rapidly in large quantities. The method that has been resorted to with some success against the blistering flies where they have been numerous on the

potato vines, may be of utility, namely, holding a pan with an inch or two of water in it, under the vines here and there, and shaking and knocking the insects off into it, the water holding them from escaping until a quantity are gathered, when they may be emptied into a bag, and another quantity gathered. They can be killed by immersing the bag in boiling water, and its contents may then be fed to the swine.

11. GARDEN TIGER-MOTH, *Arctia Caja*, Linnæus. (Lepidoptera. Arctiidae)

Eating the leaves of lettuce, strawberries, &c., a large thick-bodied caterpillar nearly two inches long, of a black color with a row of white shining dots along each side and thickly clothed with long soft hairs which are black upon the back and red on the neck and sides; enclosing itself in a thin pale brown cocoon from which towards the end of July comes a large beautiful brown moth with white spots and many irregular stripes crossing its fore wings, its hind wings ochre yellow with about four large round blue black spots.

This truly elegant insect, named *Caja* or the bride by Linnæus, and the caterpillar of which is popularly called the Garden Tiger in England, is abundant all over Europe, but as yet is quite rare in this country. Several specimens were met with in our State at Trenton Falls, by Mr. Edward Doubleday, in 1837. A male has long been in my collection, which I think was taken the same year at Canajoharie and presented me by Wm. S. Robertson; and when closing these pages for the printer, on the evening of July 27th, 1864, a female came in at the open door of my study, flying slowly around with a rustling of its wings which indicated it to be some moth of a large size and heavy body.

One of Mr. Doubleday's specimens was presented to Dr. Harris, by whom, first in the year 1841, in his Report to the Legislature on the Insects of Massachusetts Injurious to Vegetation, it was described as a new species under the name *Arctia Americana*, although Godart had previously regarded it as identical with the *Caja*, in which opinion Boisduval and other French naturalists have since continued to concur. In Agassiz' Lake Superior, Dr. Harris gives a more full description and a figure of this moth, in which he says the white spots and rivulets on its fore wings are the same as in the European insect, but that it is distinguished from that by the white band margining the thorax in front. But in a European specimen which I have before me, this white band is present and conspicuous as in the American examples, except that it is less broad; which is a circumstance of no importance in an insect subject to such great variations in its colors and marks. Thus we are left without any grounds for regarding this as different from the European species.

This moth measures from two and a half to three inches across its wings when they are extended, the males being a trifle smaller than the females. It is of a rich brown color, the hue of burnt coffee, with some of its parts bright ochre yellow or orange red, and it is variegated with spots and marks of milk white, crimson red, dark blue and black. But it varies astonishingly in its colors and marks. I draw the following description of the spots and markings chiefly from the living specimen before me, in which they appear to occur in their most usual and perfect condition.

The head is brown. The palpi or feelers form two conical points project-

ing obliquely forward and downward from the lower front part of the head, of a darker brown with longer and less dense hairs of a red color along their underside and around the mouth. Coiled up between them is the spiral tongue, of a white color, and only equaling them in length when extended. The antennæ reach a third of the length of the wings. They resemble slender, tapering threads, white, their tips brown, their basal joint red, and a brown stripe along their underside. In the males they are pectinated, each joint sending off two short brown branches. The *thorax* is globular and brown, with a broad white band in front, occupying the base of the collar and extending backward across the shoulders and uniting with the white stripe or spot upon the middle of the base of the wings. The collar is edged all around with crimson red, forming a slender margin along the lower edge of the white band and on each side crossing this band and forming a narrow arched band above it. The base of the thorax is also slenderly margined with red, which color widens on each side into a small spot. The sides of the thorax are pale brown, with a pencil of red hairs in the axilla of the wings. The *abdomen* is bright ochre yellow with a row of brownish black spots along the middle of the back, the spots transverse, four or five in number, the hind ones largest. The underside is pale brown with the edges of the segments yellow. The *wings* are brown, slightly pale towards their hind ends. Their base is white, which color near the middle of each wing is prolonged backwards into a long acute point, forward of which are two long egg-shaped brown spots placed side by side, and on the outer edge are two larger brown spots slightly parted from each other by a curved line, with a fifth spot on the inner edge. Towards the middle of each wing on the outer edge are two large white spots of an irregularly triangular form. Beyond these, crossing the wing transversely from the outer margin to the inner angle is a wavy white band which is thickened at its ends. From the middle of this band a curved branch extends forward and inward to the inner margin; and from the same point on the opposite side of the band another branch extends backward, nearly to the hind edge, when it abruptly turns outward and forward and then outward and backward, reaching the outer margin of the wing forward of the tip. In the closed wings these markings upon their hind part are observed to be beautifully symmetrical, having some resemblance to the Greek letter omega with a bar placed horizontally across its middle. The lower wings are deep ochre yellow with four large round blackish blue spots having a black margin, whereof three are situated in a row forward of the hind margin, the inner one of these being the smallest, and the fourth one, which is slightly transverse, is placed forward of the centre. The undersides are colored and marked similarly but much more pale and dim. The *legs* are brown with the thighs crimson except upon their undersides, and the shanks and hind feet are yellow on their undersides.

In respect to its colors and spots, this moth is truly protean, varying to an extent which is most astonishing. Thus the fore wings are sometimes black instead of brown, with all vestiges of the white spots and rivulets upon them vanished. In other instances they are of the same bright yellow

GARDEN TIGER-MOTH. ITS EGGS. CATERPILLARS DESCRIBED. THE COCOON AND CHRYSALIS.

or red color with the hind wings, with a few brown spots upon them; and in still other instances they are white with but a faint tinge of yellow. The hind wings sometimes have their spots diminished and nearly obliterated. In other instances these spots are increased in number and in size; again, they become confluent, forming two broad black bands across the wing; and finally, the whole wing is black and without spots. The *Arctia Parthenos* it cannot be doubted is one of the latter varieties of this species, intermediate between the banded winged and black winged varieties. It is erroneously credited to Kirby in the Smithsonian Catalogue of Lepidoptera. It was described and figured by Dr. Harris, in Agassiz' Lake Superior, and is essentially distinguished as having the base and inner margin of its hind wings black with the remaining portion yellow crossed by a broad black band.

The female moth above mentioned dropped seven hundred and forty-four eggs in the course of four days after her capture. Being so prolific it is evident this insect would very soon become as abundant in our country as it is in Europe if it were not checked in its increase. It must be that nearly all the caterpillars of each generation are destroyed, probably by birds. Judging from the proceedings of the female when in confinement, her eggs are laid upon the surface of leaves and firmly glued thereto in clusters of from fifty to one hundred, the eggs in each cluster being placed for the most part in contact with each other in regular rows. The eggs are quite small, being about 0.034 in diameter. They are globular, shining, white, with a large faint spot on their summit of a watery appearance.

The caterpillars which come from these eggs grow to about two inches in length and have a thick cylindrical body which authors describe as being of a deep black color, densely covered with long soft hairs which arise in bundles from elevated warts. These hairs are of a bright red color on the three first rings and along the sides, and on the rest of the body are black with their ends gray. The warts from which the red hairs arise are of a bluish gray color; those from which the black ones come are blackish brown. Three of these warts of a blue color and placed in a row one above the other on each side of each ring are most obvious to the eye. The breathing pores form a row of shining white dots along each side. The head is shining black; the underside and feet are blackish brown. From all the other caterpillars of our country this is particularly distinguished by the three blue warts on each side of each segment, and the conspicuous row of white dots along each side of the body. As it approaches maturity, however, its unusually large size will alone suffice to point it out. It would appear to be this creature to which Hiawatha is represented to refer, in Longfellow's much admired poem, as

"The mighty caterpillar
Way-muk-kwana, with the bear skin,
King of all the caterpillars!"

When it is fully grown it encloses itself in a grayish brown cocoon of a soft closely woven texture, intermixed with the hairs of its body. In this it changes to a chrysalis, having the form of an elongated egg, of a shining black color with the sutures yellowish brown and the pointed end two-lobed

and studded with little rust-colored points. The insect remains in the cocoon from eighteen to twenty days and then comes forth in its perfect state.

Like other caterpillars of the group to which it belongs, this is a general feeder, subsisting upon low herbaceous plants of almost every kind, and on a pinch feeding also upon the leaves of trees and shrubs. An incident related by Duponchel (Hist. Nat. des Chenilles), shows how able it is to sustain itself upon any substance of a vegetable nature which is sufficiently soft for it to masticate. Having forgotten one of these caterpillars which he had wrapped up in a paper envelope and inclosed in a wooden box, he afterwards discovered it had nourished itself upon the paper, as was proven by the dry pellets of excrement in the box, and had after this completed its transformations, producing a moth which was a dwarf in its size but with very bright colors. Some curious facts are reported, showing the colors of this moth to vary according to the quality of the food on which the caterpillar is nourished. Thus if it be fed upon lettuce or other vegetation of a similar succulent nature, the colors of the moth are more dim and pale than when it is reared on substances which are less watery. The German collectors are said to obtain the variety having the under wings black by forcing the caterpillars to feed exclusively upon the leaves of the walnut. Some of the French, however, are stated to have tried this without success. It may be that some concurring atmospherical influences, some peculiarity of the season, is also necessary to insure the particular result. The species certainly presents a most interesting subject for the experiments of amateurs.

12. CORN CUT-WORM, *Agrotis nigricans*, Linn., Var. *Maizi*. (Lepidoptera. Noctuidæ.) Plate 4, fig. 2, 3.

In June, severing the young Indian corn and other plants, half an inch above the ground, by night, and by day hiding itself slightly under the surface; a thick, cylindrical, gray worm an inch and a quarter long, with rather faint, paler and darker stripes, the top of its neck shining black with three whitish stripes.

The insects from which our farmers experienced the greatest vexation and injury the past season (1863), were the Cut-worms—the same worms which are sometimes called corn-grubs, and which in English agricultural works are termed surface grubs or surface caterpillars. The name Cut-worm, however, is most commonly given to them in this country, both in print and in common conversation, and appears to be the most appropriate and best term by which to designate them, having allusion as it does to a habit which is peculiar to these worms, namely, that of cutting off tender young plants as smoothly as though it was done with a keen-edged knife.

These Cut-worms are among the most important injurious insects of our country. It is mostly in our fields of Indian corn and in our gardens that their depredations are noticed. They are so common as to occasion some losses almost every year; whilst every few years they make their appearance in such numbers as to nearly or quite ruin the corn-fields, obliging the proprietors to plant their ground a second and even a third time, or to re-plow it and sow it with a different crop. Thus, in consequence of the pre-

CUT-WORMS. EARLY NOTICES AND RECORDS OF THEIR INJURIES.

sence of this worm in our country, the labor of the husbandman is frequently doubled to obtain from his land a crop either materially diminished in amount or of a less valuable kind from that which he would be able to harvest were it not for this enemy. The attention of the farmers of our State was this past season prominently directed to the rearing of flax, and a breadth of land was given to this crop far exceeding what has ever before been assigned to it. But soon after the young flax appeared above the ground, these Cut-worms began their depredations, feeding upon and wholly consuming the small tender plants to such an extent that many fields had large patches in them which were eaten perfectly bare, whilst in others the crop was totally destroyed.

Many of our injurious insects are new pests which have but recently been observed in our country. But these Cut-worms appear always to have been here, depredating upon and despoiling the cultivated crops in centuries gone by, the same that they are now doing. Before European settlers arrived upon this continent, the cornfields of the Indians are said to have been ravaged at times by these worms, this being of all others a disaster to them of which they were most fearful, and one which they felt themselves wholly powerless to avert, their only resort for protecting their fields from this calamity being that indicated in the lines of the poet:

"Draw a magic circle round them,
So that neither blight nor mildew,
Neither burrowing worm nor insect,
Shall pass o'er the magic circle."

And this is well known to have been a casualty of frequent occurrence all along since the soil of our country has been cultivated by civilized men. In those diaries which have occasionally been kept in different parts of our land by persons who have been curious to preserve a record of local incidents of interest, we are sure to meet ever and anon with the statement, "Indian corn was this year greatly injured by the worms," "The season was wet and cold, and the worms made extensive ravages on the corn," and other entries of the same purport. From one of these sources we learn that a century ago there had been a distressing drouth in 1761, followed by an unusually long and severe winter and a late spring. "When at last the corn was planted, millions of worms appeared to eat it up, and the ground must be planted again and again. Thus many fields were utterly ruined." (Flint's Second Report, Mass. Board of Agriculture, p. 40.) It, however, may have been the Wire-worm which occasioned at least a portion of the destruction here related, for usually when one of these worms is numerous the other is so likewise. It is unnecessary to mention other years in which we have little more than the mere fact stated that these corn worms were very injurious.

In addition to such manuscript mementoes, the published allusions to these pests date far back. Upwards of seventy years ago, when the old Agricultural Society of our State was first organized, in a circular which the Society issued, containing inquiries upon different topics on which information was solicited, the first query respecting insects was, "Is there any

CUT-WORMS. HAVE NEVER YET BEEN INVESTIGATED.

way of destroying the grubs in corn and flax?" No answer to this inquiry, of sufficient importance for publication, was received.

But, although these Cut-worms have always been such a formidable foe in this country, against which the cultivators of the soil have had to contend, they have not, down to the present day, been subjected to any careful scientific examination. It was formerly supposed they were all of but one kind, one species of insect. In our day it has been ascertained that they are of several different kinds, and that they are bred from a particular group or family of millers or moths, of a dark color, which fly about in the night time and remain at rest and hid from our observation during the day—most of them belonging to the genus named *Agrotis* by naturalists. But the observations which have been made upon these Cut-worms have been so hasty and superficial, that, when we see one of these worms cutting off the young corn in our fields or the cabbage plants in our gardens, we are unable to give it its exact name; we are unable to say what particular species of miller or moth it is which has produced that worm.

All that has yet been done towards a scientific investigation of this subject may be narrated in a few words.

Upwards of forty years ago, Mr. Brace, of Litchfield, Ct., in a short article published in the first volume of Silliman's Journal, gave what he evidently regarded as a sufficient elucidation of this matter. It appears that in a patch of ground planted with cabbages, where the worms had been numerous, he found their pupæ to be common, lying a few inches below the surface, just after the worms had disappeared. From some of these pupæ he obtained the miller or moth. In the article alluded to, he merely describes this miller as being the insect which produces the Cut-worm, naming it the *Phalena devastator* or the Devastating miller. As he supposed all the Cut-worms were of one kind, he gives no description of the worm from which this miller is produced. And thus it remains unknown to this day what the characters and appearance of the worm are which belongs to this miller which Mr. Brace described.

Some ten years after this, Dr. Harris, one season, gathered a number of full grown Cut-worms from different situations, to breed the moths from them; but what is most surprising, he took no notes of the differences in the appearance of these worms. He obtained from them four different moths in addition to the one which Mr. Brace had previously obtained. These he names and describes, but is unable to give any account of the worms which belong to either one of these species.

In the Second Report which I presented to this Society, I gave very exact figures of the miller which Mr. Brace described, and of two others of the most common millers of our country belonging to the same group; and I also described five of the Cut-worms which I had noticed as being common kinds in our cornfields and gardens. Finally, in my Third Report I was able to give an account of one of our Cut-worms, and the moth which was raised from it.

And this is the posture in which this subject now stands. Seven of the moths or millers of our country, which produce Cut-worms, have been named

CUT-WORMS. OUR ILL SUCCESS IN REARING THEM.

and described. But only one of them is known to us in its larva state. We also know that at least five other Cut-worms, in addition to this one, are formidable enemies to us, depredating every year, more or less, upon the young plants in our fields and gardens, but we know not the species to which they respectively pertain, and consequently are unable to distinguish either of them definitely, by giving to it its correct name.

I have for a great many years regarded these Cut-worms as a most important subject requiring to be elucidated. And accordingly, almost every year, upon meeting with some of these worms, I have written in my notes a particular description of them, and have endeavored to feed and rear them to their perfect state, but without success. They are very intolerant of confinement, especially when they are not grown to their full size. Upon discovering that they are imprisoned, they lose all relish for food, and become intent on one thing only, namely, to find some orifice in their prison walls through which to escape. Accordingly, when the shades of evening arrive, they come out from the earth in the box or pot in which they are placed, and crawl hurriedly and anxiously around and around, the whole night long, as I have found on going to them with a light. The vegetables transplanted into the box for them to feed upon remain untouched. In this manner, they in a few nights wear their lives away, and are found lying stark and stiff on the surface of the dirt of their cage. From the experience I have had, I regard them as among the most difficult insects which I have ever taken in hand to feed and rear from their larva to their perfect state.

It had accordingly become evident to me that a suitable knowledge of these Cut-worms could never be gained in the manner I had attempted—by casual observations made at moments snatched from other investigations. It was only by making them the leading subjects of examination; devoting to them ample time and care and vigilance; studying them as they were growing up in the fields and gardens; watching them from day to day, there, in their natural haunts, until they became fully matured and were done feeding, and then placing them in cages to complete their transformations and reveal to us what they are in their perfect states; I say, it had become evident to me that it was only in this manner that the requisite knowledge of these creatures could be obtained, to prepare such an exact history of them as their importance and the advanced state of science at this day demand.

I have, therefore, for several years, had it in contemplation, when a season occurred in which these worms were numerous, to devote my chief attention to them. And accordingly, on becoming aware last May, that these worms would be quite common in my vicinity, I resolved to make them the subjects of special investigation.

And I now proceed to give a summary account of these insects and their habits, and the progress which the researches of the past season has enabled us to make towards a more full and exact knowledge of them.

It is in midsummer, mostly in the month of July, that the moths or millers come abroad and lay the eggs from which the Cut-worms are bred.

CUT-WORMS. YOUNG WORMS IN AUTUMN. FALL FLOWING TO DESTROY THEM.

The eggs are dropped at the surface of the ground, around the roots of grass and other herbage. The worms hatch and feed during the autumn, coming abroad by night and eating the most tender vegetation which they are able to find, and during the daytime withdrawing themselves under the ground to hide from birds and other enemies, and feeding upon the roots of the vegetation which they there meet with. Grass appears to be their favorite food, and its young, tender blades and rootlets furnish most of these worms their subsistence through the first stages of their lives. During the autumn the earth is so profusely covered with vegetation and these worms are so small that no notice is taken of them or the trifling amount of herbage which they then consume. They become about half grown when the cold and frosty nights of autumn arrive, whereby they are no longer able to come out to feed. They then sink themselves deeper than usual into the ground, going down to a depth of three or four inches; and there, each worm, by turning around and around in the same spot, forms for itself a little cavity in which to lie during the winter; and it there goes to sleep, and lies torpid and motionless as though it were dead. The soil at the depth where these worms are lying very slowly and gradually becomes colder and colder as the winter comes on, and at length freezing, these worms reposing in it are also frozen. And when the warmth of spring returns, the ground thawing and becoming warm in the same gradual manner, these worms slowly thaw and awake from their long sleep and return again to life. The case is analogous to what occurs with ourselves when we have a finger or a foot frozen. On coming into a warm room, if we keep the frost-bitten part covered with snow or immersed in ice-cold water, whereby it very slowly thaws and the circulation gently and gradually returns to it, the part readily recovers; whereas, if instead of this, we hold it to the fire and thaw it suddenly and abruptly, high inflammation and gangrene follows, and we lose the limb. And so, if these Cut-worms lying in the ground should be suddenly frozen or thawed, it would be fatal to them.

This brings to our view an important measure which is much practiced for the purpose of destroying these worms and securing the corn crop from their depredations. Our farmers quite generally endeavor to break up their planting ground in the autumn, rather than in the spring, under the idea that they thereby disturb these worms in their winter quarters and expose them to the cold and frost, whereby a considerable portion of them are destroyed. And I believe it is the general experience of our farmers that corn planted upon ground which has been thus broken up in the autumn is less liable to be injured by these worms than where it has been broken up in the spring. But these worms, in common with all other insects, continue to be active in autumn so long as the weather remains warm. It is not till they feel the chill of the autumn frosts that they retire into their winter quarters. Therefore, if the ground be broken up early in autumn, when the weather is still warm and the worms are in full life and activity, it can be of little, if any avail, for the purpose intended, as they will readily crawl into the ground to the depth which they require for their

CUT-WORMS. THEIR HABIT OF SEVERING YOUNG PLANTS.

protection. In order that this fall plowing should be efficacious, it is obvious it should be deferred until near the close of the season, when the worms have withdrawn themselves downwards and are lying torpid and inactive in their winter retreat. If the turf under which they are reposing be then turned up to the surface, they will be incapable of crawling away into any new quarters, and the sudden freezings by night and thawings by day to which they will be alternately exposed, we are confident must destroy a large portion of them.

When the spring has returned and we are engaged in making our gardens, a Cut-worm is occasionally turned up to our view in digging and working in the earth there; and if grass has been permitted to grow and form a turf around the roots of currant bushes or elsewhere, upon digging up and rooting out this grass, we are quite sure of finding a number of these worms nestled among it, indicating to us that grass more than anything else furnishes them with the covert and food which they desire.

Although we thus find these Cut-worms lying in the soil of the garden early in May, it is not until the close of that month and the beginning of June that they begin to attract our notice by the injury they do in our gardens and cornfields. It is when they are grown to about two-thirds of their full size that they commence the work which renders them so pernicious to us,—that of severing the young, tender plants. Previous to this, during all the first period of their lives, as has already been stated, they lie concealed under the ground during the day time, feeding there upon the roots of plants, and only venture out by night to feed upon the green vegetation above ground. Although in England they are called surface grubs, I discover they are not restrained to the surface of the ground, but mount up the stems of young cabbages and beans and eat portions of their leaves. But, about the commencement of June, the nights have become so short and the days so long, and the worms are now grown to such a size and their appetites have become so ravenous, that they are forced to a most singular change of their habits. The insipid roots of plants fail to yield them the amount of nourishment they require during the eighteen hours of daylight. They must either stay out to feed upon green herbage during the daytime, or they must, so to speak, set their wits to work to devise some way by which they can get this herbage down under the ground so that they can there feed upon it. We accordingly see them adopting the curious expedient of cutting off tender young plants in order to draw them into the ground, whereby they may feed upon them during the long hours of the day. Is it not wonderful, that such sluggish, stupid looking creatures as these worms are, should have the intelligence to perform such a feat as this—cutting off the plant, to enable them to get the end of it down into the ground, so that they may cosily lie there and feed upon it in safety—gradually drawing it in, more and more, until by the close of the day the whole of the plant and its leaves are consumed; a feat strikingly analogous to that for which the beaver is so renowned, cutting down small trees and drawing and swimming them away to build a dam with them. Surely we should admire this loathsome-looking worm for such a skillful performance,

CUT-WORMS. THE STRIPED WORM FOLLOWED BY THE LARGER YELLOW-HEADED WORM.

were it not that it is this very act which renders this creature such a pest, such a nuisance to us !

As to the kinds of plants which these worms thus sever to feed upon them, they appear to have but little if any preferences. They relish everything that is young and tender and succulent. Thus they attack the corn, the flax, the potato stalks in our fields, and in our gardens the cabbage plants and beans, cucumber and melon plants, beets and parsnips, and also the red-wood and several other weeds. Nor are they limited to herbaceous plants. Where a sucker starts up from the root of a tree, while it is yet young and tender it is liable to be severed, if one of these worms chances to find it.

They appear to have no discrimination in their taste, but relish equally well the most acrid and bitter plants, with those which are mild and aromatic. Thus the onion stalks in our gardens are about as liable to be cut off as any other plants; and I have known the acrid smart-weed to be severed by them. The past summer, I set out in my garden a few tobacco plants, that I might notice what insects would come upon this filthy weed; and within a few days after, one of these Cut-worms gave me a very palpable reminder that he would not tax me for cabbages and beans if I would only furnish him with what tobacco he wanted to chew. I have known a piece of writing paper to be partially consumed by one of these worms enclosed in a box where it became pressed with hunger. And where several worms are enclosed together in a box of dirt, over night, without any food, it is a common occurrence for the larger ones to devour the smaller ones.

The past season, it was upon the 22d of May, in a hot bed, that I first noticed a plant severed by a Cut-worm; and the query at once arose, how could this worm get into such a close and secure place as that was? The loam forming the top of the bed had been obtained from the garden; and it was evident this worm must have been lying in the soil there, and had been brought from thence, in this soil, when the bed was being made. And the warmth of the bed had quickened the growth of this worm and brought it forward in advance of all its fellows.

Three days later, the first bean plant in the garden was found cut off by another of these worms; and from that time they continued to become more common until about the first of June, when they were out in their full force, both in the fields and in the gardens. At first I supposed the worms in the cornfields were different from those in the gardens. But the more I examined and compared them, the more assured I became that they were all of one species, although they varied greatly, some being pale and others dark, and some having very distinct stripes, whilst others had them scarcely perceptible. It was the same species which I named the Striped Cut-worm, in the Transactions of 1855, p. 545. It continued out in full force, depredating everywhere in the fields of flax and corn and in gardens, for a period of three weeks, when, the worms having got their growth, began to be less numerous, and had all disappeared at the end of the month.

Just as this worm was about to vanish, another one, larger and more voracious, came out to occupy its place and continue the work of destruc-

CUT-WORMS. DIFFERENT OPERATIONS OF THE TWO WORMS.

tion in the fields, none of them being met with in the gardens. It was on the 20th of June that, in examining a cornfield, I first noticed this second worm, lying under the sods, it being of a white or pale smoky color with a bright tawny yellow head, and the same kind which I have heretofore named the Yellow-headed Cut-worm. This cornfield had been broken up just before planting, and the roots of the grass were still juicy, succulent and unwithered, at least in all the larger masses of turf; and this worm evidently preferred these grass-roots to the young corn; for on examining a multitude of the hills of corn in which one or more of the young plants had been cut off, it was invariably the Striped worm first mentioned, which was discovered there; not one of these Yellow-headed worms had as yet molested the corn. Five days afterwards, this same cornfield was again visited. The weather in the interval had been warm and dry, whereby the grass-roots in the clumps of turf had become dry and withered, unadapted for feeding the worms any longer. And now on examining where the blades of young corn had been newly cut off, the mischief was discovered to have been done in nearly half the instances by this Yellow-headed worm, which was found lying in the earth contiguous to the severed plant. Thus, it was sufficiently demonstrated that so long as it could find any roots of grass for its nourishment, this worm did not molest the corn. Therefore the corn remained unattacked by it, until about the date specified, namely, the 25th of June. A few years before, however, I found this same Yellow-headed Cut-worm making severe havoc in a cornfield at the very beginning of June—there probably being no juicy roots of grass in this field, on which it was able to sustain itself. Having the fact thus established, that these worms will not trouble the corn, so long as they are able to find grass in the field on which to nourish themselves, it becomes an important question to be considered, whether, after all, it may not be better to break up our corn ground in the spring than in the fall; so that hereby, a portion of the roots of the turf may remain sufficiently fresh and unwithered to feed these Cut-worms and hereby keep them back from falling upon the corn. This is a difficult subject to determine; and it is only by repeated observations, carefully made, that it can be satisfactorily settled.

The operations of these two worms were so very different that upon seeing a severed plant it was readily told which worm it was that had cut it off, and would be found lying in the ground by its side. The smaller Striped worm, which first appeared, cut off the plants half an inch or an inch above the surface of the ground; and many of the plants, being severed at this height, survive the injury, new leaves pushing up from the centre of the stump. Instances were noticed, in which the worm had cut off the plant below the lower leaf, which leaf remaining, green and thrifty, the plant would thereby be vigorously sustained while new leaves were putting forth from its centre. The larger Yellow-headed worm, on the other hand, severs the plants almost an inch below the surface of the ground, whereby they are effectually killed in every instance. This worm also lies deeper in the ground than the other, it being usually met with about two inches below the surface, whilst the smaller worm only goes down

CUT-WORMS. THEIR PUPA STATE. STRIPED CUT-WORM DESCRIBED.

sufficiently to hide itself from view. It is also much more irritable, more ferocious and combative. If two of them are enclosed in a box together, and one crowds against or attempts to crawl over the other, it spitefully resents this freedom and snappishly tries to bite the intruder.

These Yellow-headed worms continued to cut off the corn for more than a week after the others had disappeared, remaining out till about the close of the first week in July.

When the Cut-worm is done feeding it crawls down into the earth to the depth of three or four inches, where it is not liable to be disturbed by any other worms inhabiting the superficial soil. It here doubles itself together in the shape of a horse-shoe, and by turning around and around in the same spot, presses the soil outward from around it, compacting it into a thin brittle kind of shell which the wet from any showers of rain will not penetrate, forming a large oval cavity with a smooth surface on its inside. In this cavity the worm lies motionless and becomes contracted in size and of a stiff and more firm consistency. The forward part of its body becomes swollen, more and more, till at length the skin bursts open upon the back and the hard shining yellow shell of the pupa begins to protrude from this opening. By slight sudden starts or shrugs, the skin is gradually thrown off and remains in a shrivelled mass at the end of the insect, which is now in its pupa form, without any mouth or feet, its shape being that of an elongated egg of a shining chestnut yellow color, thrice as long as thick, but only half as long as was the full grown worm. This pupa or chrysalis lies quiet and motionless in its oval cell under the ground for about four weeks, when its outer shell-like covering cracks open upon the fore part of the back, and the moth or perfect insect crowds itself out from it, and upward through the loose earth to the surface. The first moth from the Striped Cut-worm presented itself to us this year on the evening of the sixth of July, and upon the evening of the tenth the same moths had become exceedingly numerous. The worms had been so diversified in the depth of their color and the distinctness of their stripes, that I had confidently expected to see a similar diversity in the moths which they produced. I was, therefore, greatly surprised to find the latter remarkably uniform, no differences occurring to my observation this season that were susceptible of being described as varieties.

Now that we have ascertained the moth of this, one of our most common Cut-worms, it is important that we give the most accurate description of it and of the worm from which it comes, that we are able to draw up from the numerous specimens we have examined, and thus place this species on record so distinctly that it may ever hereafter be readily recognized.

The Striped Cut-worm, as we have heretofore termed it, is a cylindrical worm, usually about an inch in length when disturbed beside the severed plants in our gardens and corn fields, and upwards of an inch and a quarter when it is fully grown. Its ground color is dirty white or ash gray, occasionally slightly tinged with yellowish; the top of its neck shining black, with three white or pale longitudinal stripes; a whitish line along the middle of its back between two dark ones; on each side three dark stripes

separated by two pale ones, whereof the lower one is broader; often a somewhat glaucous white stripe below the lower dark one, and all the underside below this dull white. This is the best concise general description of the worm that I am able to give, the characters stated being sometimes quite faint, but in most instances sufficiently plain and distinct. I proceed to give a more full description of the several parts. The *head* is shining black, with a white stripe in the middle, which stripe is forked, resembling an inverted letter Y. The nose piece and upper lip are whitish, the former being wrinkled or longitudinally striated, and the latter having a transverse row of white bristles. The jaws are black and four-toothed. On each side is usually a white spot, and in other instances the whole head is more or less mottled with white, or is throughout of a tarnished white color with only a dusty streak on each side of its base. The *neck* above is of the same shining black color and horny substance as the head, with a white stripe in the middle, continuous with that upon the head, and a stripe on each side, curving slightly outward at its hind end. The sides of the neck are dull white, with a short double blackish stripe across the middle. The *back* is ash gray, this color forming a stripe along each side of the middle, where are two dusky lines, and between them a whitish line of the same thickness. The *sides* are dark gray or of the same dusky shade as the two lines on the middle of the back, this color being divided into three stripes of equal width by two faint pale lines, the lower one broader and formed of spots mottling the surface. These pale lines sometimes take on a glaucous white appearance, and sometimes adjoining the lower dusky stripe on its underside is a third glaucous white stripe, which is broader than those above it, and along its lower edge are the breathing pores, forming a row of oval coal black dots. The *underside*, including all below the breathing pores, is dull whitish, the legs being varied with smoky brown, and the pro-legs having a ring of this color at their base.

The *MOTH* is represented, plate 4, figure 2, with its wings spread, and figure 3 as we usually see it when at rest and with its wings closed. It measures 0.70 in length and 1.30 across its extended wings, and is of an ash or dusky gray color, and distinguished principally by two coal black spots, one nearly square, placed outside of the centre of the fore wings, and the other nearly triangular, a little forward of it, a roundish nearly white spot separating them. Its *head* is gray, and its palpi or feelers are blackish upon their outer side. These organs are held obliquely forward and upward and are densely covered with erect hairy scales, giving them a short, thick outline of a compressed cylindrical form, and cut off transversely at their ends, with a small naked joint protruding therefrom, little longer than thick, and scarcely a third of the thickness of the joint from which it projects. Coiled up between the palpi and slightly visible on their underside is the long spiral tongue or trunk. The antennæ are slender, thread-like, but tapering towards their tips. They are simple in the females, and in the male are toothed like a saw along their opposite sides, the teeth being sharp and fringed with minute hairs at their tips. The *thorax* is the thickest part of the body and is of a square form, as is very evident when the

wings are spread. It is gray, with a black band in front, edged on its hind side with an ash gray one, paler than the ground; and on the shoulder at the base of the fore wings is usually a small spot of dull pale yellow. The *abdomen* is tapering and somewhat flattened, dusky grayish, paler towards its base, its tip more blunt in the male than in the female and covered with a brush of hairs. The *legs* are blackish gray and hairy on their undersides, the spurs at the end of the middle and hind shanks being black in their middle and white at each end. The feet are five-jointed, long and tapering, the first joint much the longest and the following ones successively shorter. They are gray, gradually passing into black at their ends, each joint having a white ring at its tip. The *wings* in repose are laid flat, one upon the other, in a horizontal position, sometimes so closed together that their opposite sides are parallel, but oftener widening backward (as represented in figure 3), and forming a broad shallow notch at their hind end. The fore wings vary in color from ash gray to dusky gray, and sometimes have a tawny reddish reflection. Their outer edge is grayish black, with irregular alternations of black spots having an ash gray spot between them, and towards the tip are about three equidistant pale gray dots. The costal area or narrow space between the outer edge and the first longitudinal vein is pale ash gray, gradually becoming dull and obscure beyond the middle. At the base, on the outer edge, are two black spots or short transverse streaks, with a pale gray streak between them, and opposite these, on the basal middle of the wing, are similar streaks placed obliquely, which are frequently faded to a blackish cloud-like spot, with a pale gray streak crossing its middle. Outside of the central part of the wing are the stigmas, two large roundish pale gray spots, having a square coal-black spot between them and a triangular one forward of them. The anterior one of these stigmas is broad oval, almost circular, and placed obliquely, with its outer end more towards the base of the wing than is the inner end. It is of a uniform pale gray color, slightly paler than any other part of the wing. Its edge is well defined by the black color surrounding it, except at its outer end, where it is incomplete, being confluent with the ash gray color of the costal area. The hinder stigma is kidney-shaped, being concave on its hind side, and occupying this concavity is a pale gray spot or cloud, quite variable in its size in different specimens, and frequently taking on a buff or cream yellow tinge. This stigma is brownish or watered gray, becoming paler along its anterior edge, its ends, particularly the inner one, being vague and indefinite, blending with the adjacent coloring, sometimes so much so that only its middle portion is distinct. Between these stigmas is a large square spot of a coal-black color, occupying the whole space between the two midveins of the wing, its fore and hind sides made concave by the rotundity of the stigmas which bound it upon these sides. Forward of the anterior stigma is a second black spot of a somewhat triangular form, also occupying the whole space between the two midveins at this point. On its hind side it is concave and cut off obliquely by the obliquity of the stigma, whereby it is prolonged along the inner vein, usually into a long acute

point. Its anterior end is cut off, either transversely, obliquely or irregularly, by a faint pale grey streak, which is a portion of the anterior or extra-basal band. (See generalities preceding the description of the wings of the Tobacco-worm moth). In the best specimens this pale streak is distinctly seen to be prolonged backwards along the outer side of the black spot almost to the stigma, and then suddenly turning at a right angle, it runs obliquely forward and outward in a straight line to the outer margin, between the two small black spots which are here placed on the margin. In the opposite direction this pale streak is also prolonged from the forward end of the black triangular spot, inward and backward and curves slightly forward to the inner longitudinal vein, and beyond this, with another similar curve, is extended to the inner edge of the wing, it being margined on both sides by a black line, that along its hind side being commonly more conspicuous. And a short distance back from this line, equidistant between the inner midvein and the inner vein, may always be seen a black dot or short dash, which is the extreme point of a black stripe called the teliform stigma, which is common upon the wings of the moths of this genus, but in this variety of this species is wholly wanting, except this minute vestige of its apex. And also crossing this inner half of the wing obliquely at about two-thirds of the distance from the base to the hind edge are two other parallel blackish lines, representing the post-medial band. The anterior one of these lines is irregularly wavy and angular, and turns obliquely forward as it approaches the posterior stigma, and appears to pass into the inner hind angle of the square black spot. The posterior line, as traced from the inner edge of the wing, curves slightly backward till it reaches a point a short distance back of the inner end of the hind stigma, when it becomes nearly transverse, and then curves forward and obliquely outward to the outer edge of the wing, ending in the posterior one of the two black spots which are on the outer edge opposite to the anterior side of the hind stigma. This line, in the middle of the wing, is festooned or made up as it were of crescents united at their ends, these ends projecting backwards and forming about four acute angular points; and sometimes this line is made more distinct by a faint pale gray line bordering it on its hind side, at least in the concavities of the crescents. But both these blackish lines are commonly quite faint and entirely vanish in many specimens. Beyond this, a broad space on the hind border of the wing is darker colored and traversed by a whitish line, which is wavy and often broken into a series of small irregular spots, these spots sometimes having larger black cloud-like spots adjoining them on the fore side. Back of the outer end of this line the tip of the wing is occupied by a triangular gray spot. The hind edge is faintly sinuated, with a series of slender black crescents surmounting the sinuosities. The fringe is concolor with the portion of the wing immediately forward of it. The hind wings are smoky whitish, with a broad dusky hind border, dusky veins, and an obscure dusky crescent near the centre. Their fringe is dull white with a dusky band near its middle. On the underside they are clearer white, with a broad, dusky hind border and sprinkled with dusky scales

towards the outer side. The veins are not marked with dusky, except a spot or short streak upon each of them, forming a transverse row forward of the hind border, which row becomes obsolete towards the inner edge and towards the outer edge is confluent, forming a dusky band. The central crescent is more distinct than on the upper side, and on the hind edge is a row of slender black crescents. The fore wings are dusky, of the same shade with the border of the hind pair, becoming slightly paler towards their bases. They show an oblique black streak on the outer edge between the middle and the tip, and immediately beyond this is a very faint band crossing the wing parallel with the hind margin.

The description now given makes it apparent, I think, that this moth is not essentially different from the species of *Agrotis* named *nigricans* by Linnaeus, which species we have upon this continent with the same varieties described by authors as occurring in Europe. In this species the teliform stigma is marked by two parallel lines connected by a rounded mark at their ends. But in the examples which I bred from the Cut-worms of the corn, and all those which I captured that season a mere dot was the only remaining vestige of this stigma. Therefore to facilitate future references to this particular variety of which I have here treated, it may be well to separate it under a distinct name, which I have accordingly done.

The larger Yellow-headed Cut-worm which came out as this was disappearing, produced as I expected, the same moth which was described in my Third Report, under the name *Hadena amputatrix*, the Amputating brocade moth.

Thus it was the larvæ of these two insects which were so numerous and did all the injury to our crops the past season, neither of these being the species which Mr. Brace describes as the insect which produces the Cut-worm. And it is therefore evident that in different years and at different localities, it is sometimes one sometimes another of the insects of this group which becomes multiplied and injurious to us; whereby it will require a series of observations extending through several seasons to obtain a full acquaintance with them.

Before leaving this subject I may advert to one of our most efficient natural destroyers of these Cut-worms, which correspondents are occasionally sending me, for information as to its name, its origin, &c. It is the larva of a large black beetle, (Plate 4, fig. 4), having rows of round dots upon its back resembling burnished gold, the brilliancy of which dots cause it to be frequently noticed as it is wandering about in plowed fields and pastures in search of food, the beetle as well as its larva subsisting upon these Cut-worms. It is the Bold *Calosoma*, *Calosoma calidum* as it is named in scientific works, and pertains to the order COLEOPTERA and the family CARABIDÆ.

Its larva (Plate 4, fig. 5,) is a flattened, black, worm-like creature, having six legs inserted upon its breast, and a pair of sharp hook-like jaws projecting in front of its head, giving it, in connection with the agility of its movements, a very ferocious and formidable appearance. It is curious to watch this little creature when it is upon a hunting excursion, in pursuit

CUT-WORMS. THEIR DESTROYER'S MODE OF KILLING THEM.

of its prey. It wanders about over the plowed land, until it comes upon a spot where it perceives the surface has been newly disturbed. This indicates to it that a worm has probably crawled down into the ground at that spot. It immediately thereupon roots down into this loosened dirt, and disappears from view, the motion of the dirt indicating its movements, as it pushes itself along. At times it lies perfectly still, to discover if any worm is moving in the dirt anywheres near it. Now it is the habit of the Cut-worm, the same as of most other worms, when any other creature approaches and disturbs it, to give at short intervals a sudden, spiteful jerk, to menace and frighten away the intruder. But now, aware by the brisk motion made in the dirt near it, of the proximity of its mortal foe, it restrains itself from its wonted habit, and lies as still as though it were dead. It is only by some motion in the dirt, or by coming abruptly against it with its head and feelers, that this destroyer can discover the worm, for I have seen it draw the hind part of its body along the side of a worm which was lying perfectly still, and crawl away, without being made aware of the worm's presence by touching it in this manner.

One of the most interesting and wonderful exhibitions of insect economy which the world affords, is this *Calosoma* larva murdering a Cut-worm. The larva it may be is young and less than half the size of the worm, but the little hero never shrinks from the encounter. Upon discovering a worm he is instantly on the alert, all vivacity and as if crazy with excitement. The worm perhaps holds its head bent down stiffly upon its breast. The larva hereupon briskly roots and pushes the worm about and pinches it with its jaws, whereby he gets it to throw back its head, whereupon he instantly grasps the worm by its throat, sinking his sharp jaws through the skin, and clinging thereto with the grip and pertinacity of a bull dog. The worm maddened by the pain, writhes and rolls over and over and thrashes his tormentor furiously about to break him off from his hold; he coils his body like a *Boa constrictor* tightly around him to pull him away: he bends himself into a ring with a small orifice in the centre, and then briskly revolving, draws him through and through this orifice to tear him off; but every expedient of the poor worm fails. The larva clings to his grip upon the worm's throat, till the latter, exhausted by his violent struggles, gradually relaxes his efforts, becomes more and more weak and powerless, and finally succumbs to his fate. Having thus killed the worm the larva leisurely proceeds to feed upon it, biting two or three holes through the skin in different places to suck out its contents. It is occupied three or four hours in completing this work. And the larva becomes so gorged hereby that its own skin is distended almost to bursting. It then crawls slightly under ground, and there lies and sleeps off its surfeit, and then comes out and wanders off in search of another meal of the same kind.

When this larva is small a single Cut-worm suffices it for one or two days; but as it approaches maturity it devours one or two worms daily.

13. NEBRASKA BEE-KILLER, *Trupanea Apivora*, new species. (Diptera, Asilidæ.) Plate 4, fig. 7.

Killing the honey bee in Nebraska; a large slender-bodied two-winged fly, an inch long.

Whilst we are occupied in closing this Report to place it in the printer's hands, July, 1864, a new insect comes under our examination, of such an interesting character that we herewith present a figure of it, and the following account, the principal portion of which we have also communicated to the *Country Gentleman*.

R. O. Thompson, Esq., Florist and Nurseryman, in a note dated Nursery Hill, Otoe county, Nebraska, June 28th, 1864, says: "I send you to-day four insects or animals that are very destructive to the honey bee, killing a great number of them, and also of the Rose bugs. What are they? Many wish to know what this Bee-killer is. Is it the male or the female that has the three-pronged sting?"

The specimens, two of each sex, laid between pledgets of cotton wool in a small pasteboard box and forwarded by mail, came to hand in good condition, admitting of a very satisfactory examination. They are a large two-winged fly, having a long and rather slender and tapering body, about an inch in length, with small three-jointed antennæ, the last joint being shorter than the first, and giving out from its end, and not from its side, a slender bristle. The ends of its feet are furnished on the underside with two cushion-like soles, and the crown of its head is hollowed out or concave, and in this hollow is seen three little glassy dots or ocyetes. These characters show it to pertain to the order DIPTERA, and to the group which Linnaeus a century ago separated as a genus, under the name *Asilus*, but which is now divided into several genera, forming the family *Asilidæ*. On inspecting its wings we see the two veins which end one on each side of the tip of the wing are perfect and unbroken, and towards the middle of the outer one they are connected together by a small veinlet or short transverse vein. This indicates these flies to pertain to the genus named *Trupanea* by Macquart.

About a half dozen species inhabiting the United States and pertaining to this genus have been described by Wiedemann, Say, and others. This Nebraska fly appears to be different from either of those, and I am, therefore, led to regard it as a new insect, hitherto unknown to the world. And a more appropriate name cannot be given it than that by which it is called by Mr. Thompson and his neighbors, the Bee-killer or *Trupanea Apivora*. The general definition of this species, or its brief essential characters will be, that it is dull black with the head yellow, the fore body butternut brown, the hind body on its underside and the legs pale dull yellow, the thighs being black on their foresides, and it is coated over with hairs which are gray in the female and grayish yellow in the male, the end of the body in the latter sex having a conspicuous silvery white spot.

In this *Asilus* group of flies the species are separated from each other by marks which are often very slight and obscure. It is, therefore, important that a detailed description of these Nebraska flies should here be

given, that they may not be confounded with any other species which may be closely similar to them.

They measure to the end of the wings 0.85 to one inch, and to the end of the body 0.95 to 1.15, the males being rather smaller than the females. The *head* is short and broad, shaped like a plano-convex lens, flat on its hind side and convex in front. Its summit or crown is deeply excavated, leaving a vacant space between the upper part of the eyes, in the middle of which excavation are the ocelli or eyelets, appearing like three black glassy dots placed at the corners of a triangle. The ground color of the head is yellow. All the face below the antennæ is covered with long hairs forming a moustache of a light yellow color, with a tuft of short black bristles at the mouth, and on each side are whiskers of a yellowish gray color. The base of the head has a sort of collar formed of radiating gray hairs, and behind the upper part of each eye is a row of black bristles. The eyes are large and protuberant, occupying two-thirds of the surface of the head, and are finely reticulated or divided into an immense number of minute facets. The antennæ are inserted at the anterior edge of the excavation in the crown of the head. They are small, scarcely reaching to the base of the head if turned backward. They are black and composed of three joints, the first one longest and cylindric; the second shortest and obconic; the third thickest and egg-shaped, its apex ending in a bristle which is about equal to the antenna in length, and is slightly more slender towards its tip, where it becomes a little thickened. The trunk or proboscis is as long as the head, its end projecting out from the bristles of the face. It appears like a long, tapering tube of a hard crustaceous texture, black and shining, blunt at the end, with a fringe of hairs around the orifice. In one specimen the tongue protrudes from the orifice in the end of the trunk, sharp pointed and like the blade of a lancet in shape, hard, shining and black. The *thorax* or fore body is the broadest part of the insect, and is of a short oval form, with bluntly rounded ends. It is of a tarnished yellowish brown or butternut color, with two faint gray stripes along the middle of the back, alternating with three darker brown ones. It is bearded with black hairs and posteriorly with long yellowish gray ones, which are interspersed with black bristles. The *abdomen* or hind body is long, slender and tapering from its base in the male, and is more broad and somewhat flattened in the female. It is black above and covered with prostrate hairs, which are dull yellow in the male and gray in the female. On the sides and beneath the ground color is dull yellow in the male and gray in the female, and clothed with gray hairs in both sexes. The two last segments, the eighth and ninth, are conspicuously protruded, making two or three more segments than are usually visible externally in insects. In the female these segments taper to an acute point, and are black and shining. In the male they appear like a cylindrical tube with a projecting valve underneath at the base, and are coated over with dull yellow hairs, and on the upper side with silvery white ones, pressed to the surface and forming a conspicuous oblong spot of this color, which is two-lobed or notched at its ends. And in the dead specimens before me three bristle like processes

over a tenth of an inch in length, of a tawny yellow color, polished and shining, project from the blunt end of the body. These are termed a three-pronged sting in the above letter. But the magnifying glass shows they are abruptly cut off at their ends and do not taper to a sharp point capable of piercing the human skin. The *legs* are long and stout and of a pale, dull yellowish color. The thighs in the males are chestnut brown, and on their anterior sides they are dull black in both sexes, the hind pair being entirely black, except a stripe of dull yellowish along the under side. The hind shanks also are frequently black on their anterior sides. The legs are covered with gray hairs and have several black bristles in rows running lengthwise. In the males the four anterior shanks and feet have the hairs yellow, and on the feet the bristles also are of this color. The *wings* are long and narrow, and in repose are laid flat, one upon the other. They are transparent, with a smoky tinge, and are perceptibly darker at their tips. Their veins are black, except the parallel ones in the outer border, which are dull yellowish brown. The broad pane or panel at the tip of the wings, which is technically termed the second sub-marginal cell, rapidly narrows as it extends forward into the wing, for two-thirds of its length, the remaining third being quite narrow, with its opposite sides parallel. Along the vein which forms the boundary of this cell on its outer side, is a perceptible smokiness, which is not seen along the sides of the other veins. This vein is slightly bent in the form of a bow two-thirds the length of the cell, when it abruptly curves in the opposite direction, and is then straight the remainder of its length. A veinlet connects it to the next longitudinal vein, thus forming between the anterior portions of these two veins a third sub-marginal cell, which is very long and narrow.

The arrangement of the veins in the wings, forming three submarginal cells as above described, induces me to refer this species without hesitation to Macquart's genus *Trupanea*; although the silvery white spot on the tip of the male abdomen would indicate it to pertain to the genus *Erax*, as restricted by the same author.

The brief note of our correspondent gives us no particular information upon the habits of these flies or the manner in which they attack and kill the bees. But the members of this *Asilus* group are all so similar in their habits that we are aware what the operations of this species will be. And some account of the habits of these insects may be of sufficient interest to the reader to be here related.

These *Asilus* flies, like some other of our most rapacious insects, particularly delight in the hot sunshine. One or two evidences of this may here be adduced.

Flies of this kind are rare in my vicinity. I suppose I might hunt for days without being able to find a living specimen. And I do not recollect to have ever seen one of them, hitherto, about my house or yard. Three days ago, however, when occupied in preparing this account, I casually spread some damp newspapers before my door to dry in the hot sun. On stepping out to gather up these papers I was most agreeably surprised to see alighted upon one of them and basking in the sun, what proves to be a

BEE-KILLER. ITS FETID ODOR. CRUEL MODE OF KILLING ITS PREY.

species of *Trupanea* which I had never met with before, and which is closely like though probably distinct from this Nebraska Bee-killer. The genial warmth reflected from the white surface of the paper lying in the clear sun had evidently attracted it to this unusual situation.

So late as the month of October, ten years ago, upon a clear warm day, in a sunny nook upon the south side of a forest, I came upon quite a number of the *Erax rufibarbis*, flying about and alighting upon the leaves—a species I have never met with except in that instance. They were warmed into such quickness of motion, and were so extremely vigilant and shy of my approach, that with my utmost skill I was able to capture but two individuals which were impeded in their movements from being paired together. I infer these Nebraska flies to be common and far less wary than the species alluded to—else our correspondent would have been unable to secure two individuals of each sex to transmit to us. And I suspect these specimens were obtained when they were copulated. If so, it is probable that the three sting-like bristles which I have described above, are not protruded and visible externally, except at such times.

In flying, these insects make a very loud humming sound, which can scarcely be distinguished from that of the bumble-bee; and when involved within the folds of a net, they utter the same piping note of distress as does that insect. This very probably contributed to impress our correspondent with the thought that the three bristles which are extruded by the male are a formidable three-pronged sting.

Another fact which I do not see alluded to by any author, is the fetid carion-like odor which some of these *Asilus* flies exhale. I noticed this odor in the *Erax rufibarbis* which was captured as above related. And in these Nebraska specimens, though they have now been dead a fortnight and freely exposed to the air the latter half of that time, this disgusting scent still remains, and so powerful is it that on two occasions nausea has been produced when they have happened to be left upon the table beside me. As the newly captured fly above mentioned is wholly destitute of this fetor, it may be that it is only at the period of sexual intercourse that it occurs.

These flies are inhuman murderers. They are the savages of the insect world, putting their captives to death with merciless cruelty. Their large eyes divided into such a multitude of facets, probably give them most acute and accurate vision for espying and seizing their prey; and their long stout legs, their bearded and bristly head, their whole aspect indicates them to be of a predatory and ferocious character. Like the hawk they swoop upon their prey, and grasping it securely between their fore feet they violently bear it away. They have no teeth and jaws wherewith to bite, gnaw and masticate their food, but are furnished instead with an apparatus which answers them equally well for nourishing themselves. It is well known what maddening pain the horse flies occasion to horses and cattle, in wounding them and sucking their blood. These *Asilus* flies possess similar organs, but larger and more simple in their structure, more firm, stout and powerful. In the horse flies the trunk or proboscis is soft, flexible and sen-

BEE-KILLER. ITS HABITS AND DESTRUCTIVENESS.

sitive. Here it is hard and destitute of feeling—a large, tapering, horn-like tube, inclosing a sharp lance or spear-pointed tongue to dart out from its end and cut a wound for it to enter, this end, moreover, being fringed and bearded around with stiff bristles to bend backward and thus hold it securely in the wound into which it is crowded. The proboscis of the horse flies is tormenting, but this of the *Asilus* flies is torturing. That presses its soft cushion-like lips to the wound to suck the blood from it; this crowds its hard prickly knob into the wound to pump the juices therefrom. It is said these *Asilus* flies sometimes attack cattle and horses, but other writers disbelieve this. Should any of our Nebraska friends see one of these bee-killers alighting upon and actually wounding horses or cattle, we hope they will inform us of the fact, that this mooted point may be definitely settled. Certain it is that these flies nourish themselves principally upon other insects, attacking all that they are sufficiently large and strong to overpower. Even the hard crustaceous shell with which the beetles are covered fails to protect them from the butchery of these barbarians. And formidably as the bee is equipped for punishing any intruder which ventures to molest it, it here finds itself overmatched and its sting powerless against the horny proboscis of its murderer. These flies appear to be particularly prone to attack the bees. Robineau Desvoidy states that he had repeatedly seen the *Asilus diadema*, a European species somewhat smaller than this of Nebraska, flying with a bee in its hold. But it probably does not relish these more than it does other insects. We presume it to be because it finds them in such abundance, as enables it to make a meal upon them most readily, and with the least exertion, that these Nebraska flies fall upon the bees and the rose bugs. And so large as they are, a single one will require perhaps a hundred bees per day for its nourishment. If these flies are common, therefore, they will inevitably occasion great losses to the bee keepers in that part of our country.

No feasible mode of destroying this fly or protecting the bees from it at present occurs to me. Indeed such an accurate knowledge of the particular habits of this species as we do not at present possess, is necessary, to show in what manner it can be most successfully combatted.

Since the foregoing account was written, Mr. Thompson has favored us with another communication, giving some most interesting observations upon the habits and destructiveness of this insect, which we here append in his own words. He says, My attention was first called to this fly destroying the honey bee by a little boy, a son of D. C. Utty, Esq., of this place. After sending you the specimens I watched its proceedings and habits with much care, and find that, in addition to the honey bee and rose bugs, it devours many other kinds of beetles, bugs and flies, some of which are as large again as itself. It appears to be in the months of June and July that it is abroad upon the wing, destroying the bees. None of them are now (August 2d) to be seen. When in pursuit of its prey it makes quite rapid dashes, always capturing the bee on the wing. When once secured by wrapping its legs about it, pressing it tightly to its own body, it immediately seeks a bush or tall weed, upon which it alights and commences

BEE-KILLER. ITS TENACITY OF LIFE.

devouring its prey by eating (piercing) a hole into the body and in a short time entirely consuming it (sucking out the fluids and soft internal viscera) and leaving only the hard outer skin or shell of the bee. Upon the ground beneath some favorable perch for the fly near the apiary, hundreds of these shells of bees are found accumulated in a single day—whether the work of one fly or of several I am not able to say. I have just returned from a professional tour through the northern portion of our Territory, taking Nursery orders; and in many things this business and the apiary are closely connected. In no case have I found a hive of bees that has thrown off a swarm this season! The dry weather, bad pasture and other reasons were assigned as the cause. But many persons, since they have found this fly at his work of destruction, now believe it to be the cause of the non-swarming of their bees; and I am led to the same opinion. I have only to add further, that this Bee-killer delights in hot, dry weather, and is very invulnerable and tenacious of life. I have observed the honey bee and also the hornet sting it repeatedly, but with no other effect than to cause it to tighten its hold upon them. Once when I forced the assassin to release his prey, he gave me such a wound in the hand as has learned me ever since to be cautious how I interfered with him. He will live an hour with a pin thrust through his body which has been dipped in the solution of cyanuret of Potassium.

THE HOP APHIS.

From an Address delivered before the Annual Meeting of the State Agricultural Society
Albany, February 8th, 1865.

The insect which the past season attracted the most notice and did the most damage in our State, was the Aphis or Plant-louse upon the hops. Although the hop has been growing, both wild and cultivated, in this country, from time immemorial, I am not aware that this enemy has ever attacked or been observed upon it, until two summers ago, when it suddenly made its appearance in excessive numbers; and in consequence of its advent, the two past years have been the most disastrous to the extensive hop growers in the central section of our State, which they have ever experienced. In some yards the hops have not been picked, and in other yards a portion of those that have been gathered, it is said, ought never to have been dried and put up for market, they are so small and worthless; whilst the best that have been grown are of an inferior quality, the bitter principle, on which their value depends, being deficient, according to the published reports, to the extent of from 15 to 25 per cent.

The newspapers and agricultural periodicals have abounded with notices of this failure of the hop crop. From the extended accounts which some of these publications have given, it would appear that there are three different maladies with which the hop vines have recently become affected, namely, the Aphis or plant-lice, the honey dew, and the black blight. The plant-lice are soft pale yellowish-green insects, not so large as the head of a pin, which remain stationary upon the under sides of the leaves, crowded together and wholly covering the surface. The honey dew appears on the upper surface of the leaves, as a shining, clear and transparent fluid, sticky, like honey smeared over the surface. The black blight also occurs on the upper sides of the leaves and resembles coal dust sifted upon and adhering firmly to them, or the leaves look as though they had been held in the smoke of a chimney until they had become blackened over with soot. This black blight is deemed to be a kind of fungus growing from the leaves, analogous to the rust and smut in grain, and it is stated that in some hop yards sulphur has been dusted over the leaves to kill or check its growth, but without having the slightest effect upon it.

Which of these maladies is the most pernicious, it would be difficult to judge from the published accounts, one writer seeming to regard the Aphis as the principal evil, whilst another wholly ignores this insect and dwells upon the black blight as being the cause of the failure of the crop. And it is not a little amusing to observe how very wise the reporters to some of the newspapers appear in giving an account of these diseases, and what a display of scientific lore they make, when their statements betray to us

the fact that they have not the first correct idea upon the subject on which they are writing.

The truth is, these three maladies, about one and another of which so much has been said, are all one thing—differing merely as cause and effect. If there were no lice on hops there would be no honey dew and no black blight. I am aware the hop growers will be much surprised at this statement, and will scarcely credit it, they have been so accustomed to regard these things as distinct from and in no wise connected with each other—deeming the honey dew to be a fluid which has exuded from the leaves in consequence of some disease therein, and the black blight to be, as already stated, a kind of fungus growing from the leaves, whilst the plant lice, occurring only on the opposite or under side of the leaves, appear to be wholly separated from these substances upon their upper surface. But I am perfectly assured of the correctness of what I say, and can produce specimens which will demonstrate that I am correct. I regret that this subject did not occur to my mind last summer, or I would have had such specimens for exhibition here at this time. Upon the first opportunity, I will procure and place in the Museum of our Society, specimen of leaves showing this honey dew upon them, and others showing the black blight; and by the side of these leaves I will place white paste-board cards having the same honey dew and the same black blight upon them—thus demonstrating that these substances do not exude and grow from the leaves unless they also exude and grow from the paste-board cards.

I will now briefly explain how these two substances come upon the leaves.

Each *Aphis* has two little horns projecting from the hind part of its back, which horns are termed the honey tubes. From these tubes the fluid called honey dew is ejected, in the form of minute drops, like particles of dew, which, falling upon the leaves beneath them, the upper surface of the leaves becomes coated over with this fluid, more or less copiously as the *Aphides* producing it are more or less numerous. And now, this deposit of honey dew being exposed to the action of the atmosphere and alternately moistened by the dews at night and dried by the sun by day, is gradually decomposed, changing from a clear, shining, transparent fluid, to an opaque, black substance resembling soot, and it is then the black blight. In this simple manner do we account for and explain these phenomena—these three important diseases of the hop, about which so much has been said and such erudition has been displayed by some of the writers in our newspapers.

These same phenomena, called honey dew and black blight, are not peculiar to the hop, but occur on other kinds of vegetation when infested by plant-lice; and an abundance of authority will substantiate my statement that this honey dew is caused by these insects. But I find no allusion to the black blight in any author, and what I state of that is the result of my own observations. It is proper, therefore, that I here adduce some of the evidence which I have, upon this particular point.

It is over twenty years ago that I first noticed this blackness as being occasioned by plant-lice. Among several willow trees by the side of a stream near my residence, there was one so thronged with the willow *aphis*

that I went several times to that tree to contemplate the spectacle which these insects presented. And all through the following winter, no person passing within sight of that tree could fail of noticing the blackness of its trunk and limbs, it being the more remarkable as none of the other willow trees around it had any tinge of this color. The thought thereupon became impressed upon my mind, that it was the plant-lice with which this tree had been so overrun the preceding summer, which had in some way imparted this blackness to its bark. Two or three winters afterwards, I noticed the same blackened appearance to a pine tree, which tree I knew had been thronged with Aphides the summer before. I need not specify the several other instances of this phenomena which I have noticed. Several years since, when I was investigating the Aphis of the apple tree, I discovered that, in addition to the bark of trees, the leaves also acquired this sooty appearance, from these insects; and then, upon giving this subject a particular examination, I became assured that this black substance was merely the honey dew in a decomposed state.

Some writers have remarked that dry weather causes the several kinds of plant-lice to increase and become pests to the different species of vegetation which they respectively inhabit; and my own observations incline me to regard this remark as being correct. During the dry period in June which frequently succeeds the spring rains, I have in particular years noticed these insects as occurring in unusual numbers, whereupon I have apprehended that, having acquired such a start so early in the season, they would prove to be the most pernicious insects of the year; but rainy weather coming on after this, they have seemed thereupon to decline and have ceased to attract further attention. Hence I think it true as a general rule, that dry weather favors and wet weather retards their increase. And at first thought, this view is further strengthened by the fact that this Aphis upon the hops was so excessively numerous the past summer, when we experienced a drouth of such protracted length and severity. But, on the other hand, these insects were similarly numerous the year before, when the summer was unusually wet. We are thus assured there is some influence more potent than the hygrometric state of the atmosphere, which has brought them forth in such hosts upon the hops.

Perhaps in no other group or family of insects are the different species so very closely akin to each other as in this of the Aphides. So nearly identical are most of them, both in their appearance and habits, that we know them to be distinct species only from the fact that they inhabit different plants, each one being unable to sustain itself upon any other than the plant to which it belongs. Being thus intimately related, we should confidently expect that the same atmospherical or other influence which causes one species to suddenly multiply and become extremely numerous, would operate upon and similarly affect the other species also. But this is by no means the case. As every one will remember, in the summer of 1861, all our fields of grain suddenly became so thronged with the Grain Aphis as to throw the whole country into alarm. Why did not the same cause which brought that insect upon us in such a remarkable manner, operate also to bring this insect upon the hops at that time, instead of

two years later? Or, if this insect was not then in our country, when it did appear in such vast numbers two years ago, why was not the same influence which occasioned its surprising multiplication then, felt also by the Grain Aphis, causing it to re-appear in our grain fields? The two insects being so intimately related, it is a mystery beyond the reach of human comprehension, how some hidden influence comes to operate upon the one, causing it to multiply and increase so astonishingly, whilst the other remains passive and not in the least affected by it.

This insect is not limited to the extensive hop plantations in the central parts of this State, but appears to have everywhere overrun the hop vines, both wild and cultivated. It was abundant the past summer in my own neighborhood, and specimens were also sent me from St. Lawrence county, whereby we know that its range extends to the eastern and northern confines of the State, but farther than this we do not possess any definite information.

This Aphis appears to be identical with that which has long been known in Europe as the worst enemy of the hop, and which sixty-five years ago received its scientific name, *Aphis Humuli* or the Hop Aphis, from the German naturalist Schrank (*Fauna Boica*, vol. ii, p. 110.) Messrs. Kirby and Spence, in their introduction to Entomology (American edition, p. 135,) speak of the damage inflicted by this insect as follows: "Upon the presence or absence of Aphides, the crop of every year depends; so that the hop-grower is wholly at the mercy of these insects. They are the barometer that indicates the rise and fall of his wealth, as of a very important branch of the revenue, the difference in the amount of the duty on hops being often as much as £200,000 per annum, more or less, in proportion as this fly prevails or the contrary." This statement forcibly shows what a direct interest our own government has in patronizing these investigations in which I am employed—this one little insect, in years when it is numerous, taking from the revenue of the British government half a million of dollars!

My own researches upon this insect are obviously too limited as yet, to enable me to give such a particular history of its habits and operations, as its importance merits. I therefore present the following account from the London Gardener's Chronicle, for the year 1854, page 429:

"As soon as the Aphides settle upon the hops, they suck the underside of the leaves, and immediately deposit their young, which are viviparous, and have the singular faculty of propagating their species within a few hours after their birth; and in this manner many generations are produced without the intervention of the fully formed Aphis fly; indeed, upon one hill of hops, millions of lice are born and die, neither parents nor progeny having ever attained the condition of the perfect insect. When the first attack of these flies upon the hops is severe, and early in the season, the growth of the plant is commonly stopped in the course of three or four weeks. If the attack be late, that is about mid-summer or afterwards, the vine has then attained so much strength that it struggles on against the blight, to its disadvantage, and the result is a total failure of the crop at least; for the leaves fall off, and the fruit branches being already formed,

there is no chance of recovery. At this time, and in this condition, the stench from the hop plantation is most offensive. * * * *

"The progress and usual termination of the *Aphis* blight may be thus described: The flies, as before remarked, on their first arrival, immediately suck the underside of the upper small leaves of the vine, and thus they there deposit their young, upon the most succulent part of the plant. The multiplication of the lice is so rapid, that the leaves become so thickly covered as scarcely to allow a pin to be thrust between them. They quickly abstract the juices of the vine, so that the leaves assume a sickly, brown hue, and curl up, and the vine itself ceases to grow, and falls from the pole, the lice continuing till they perish for want of food; and thus the crop is destroyed, and the grower may often consider himself fortunate if the plant recovers a due amount of vitality to produce a crop in the following year, for occasionally the hills are killed by the severity of the attack. This description, of course, applies only to the most severe and unusual blights."

The *Aphides* are the most evanescent of all insects. They spring up suddenly, in such immense numbers as to threaten the utter destruction of the vegetation on which they subsist, and ere long they vanish with equal suddenness—sometimes continuing but a few weeks, and rarely remaining in force longer than through one year. It thus appears, that, so long as the atmospherical or other influence which favors their increase, continues to operate upon them, they thrive and prosper, and when this influence passes away they rapidly decline. The writer in the *Gardener's Chronicle*, cited above, remarks of this *Aphis* on the hops, "These insects are remarkably susceptible of atmospherical and electrical changes, and on a sudden alteration of the weather we have known them perish by myriads in a night. This was specially exemplified in the Farnham district, about the middle of June, 1846, which suddenly recovered from a most severe attack, and afterwards produced the largest crop ever known in that quarter. We know, also, several instances in East Kent, which occurred in the same year, when the planters sold their growths on the poles at a few shillings per acre, and these same plantations so far recovered that many of them afterwards produced a crop worth from 30*l.* to 50*l.* per acre."

The decline and disappearance of these plant lice is greatly expedited by other insects which destroy them; and in many instances it is to these destroyers rather than to any atmospherical change, that the vegetation on which they abound becomes so suddenly released from them. No other tribe of insects has so many enemies of its own class as the plant lice. The different species of *Coccinella* or lady-bugs which are everywhere so common, live exclusively upon the aphides, as do also the larvæ of the two-winged *Syrphus* flies and the four-winged Golden-eyed flies. Superadded to these destroyers the plant lice also have their internal parasites—exceedingly minute worms or maggots residing within their bodies and feeding upon till they kill them. Thus, whenever a tree or shrub becomes thronged with plant lice, these destroyers gather among and around them, in rapidly augmenting numbers, and subsist upon them until they have wholly exterminated them. Kirby and Spence (page 187) state that in the

year 1807 the sea shore at Brighton and all the watering places on the south coast of England, was literally covered with lady bugs, to the great surprise, and even alarm, of the inhabitants, who were ignorant that their little visitors were emigrants from the neighboring hop-grounds, where each had slain his thousands and tens of thousands of the aphids.

These several kinds of destroyers of the plant lice were everywhere common upon the hop vines the past summer. I believe that in every instance in which leaves with the lice upon them were sent me by correspondents, I found one or more of these destroyers also upon the leaves; and in one box that came to me, not one of the lice was remaining, all having been devoured by several of these enemies which had happened to be inclosed in the box. These destroyers having been so common, it is quite probable that they have now subdued these lice to such an extent that the coming season the crop will be much less if at all damaged by them.

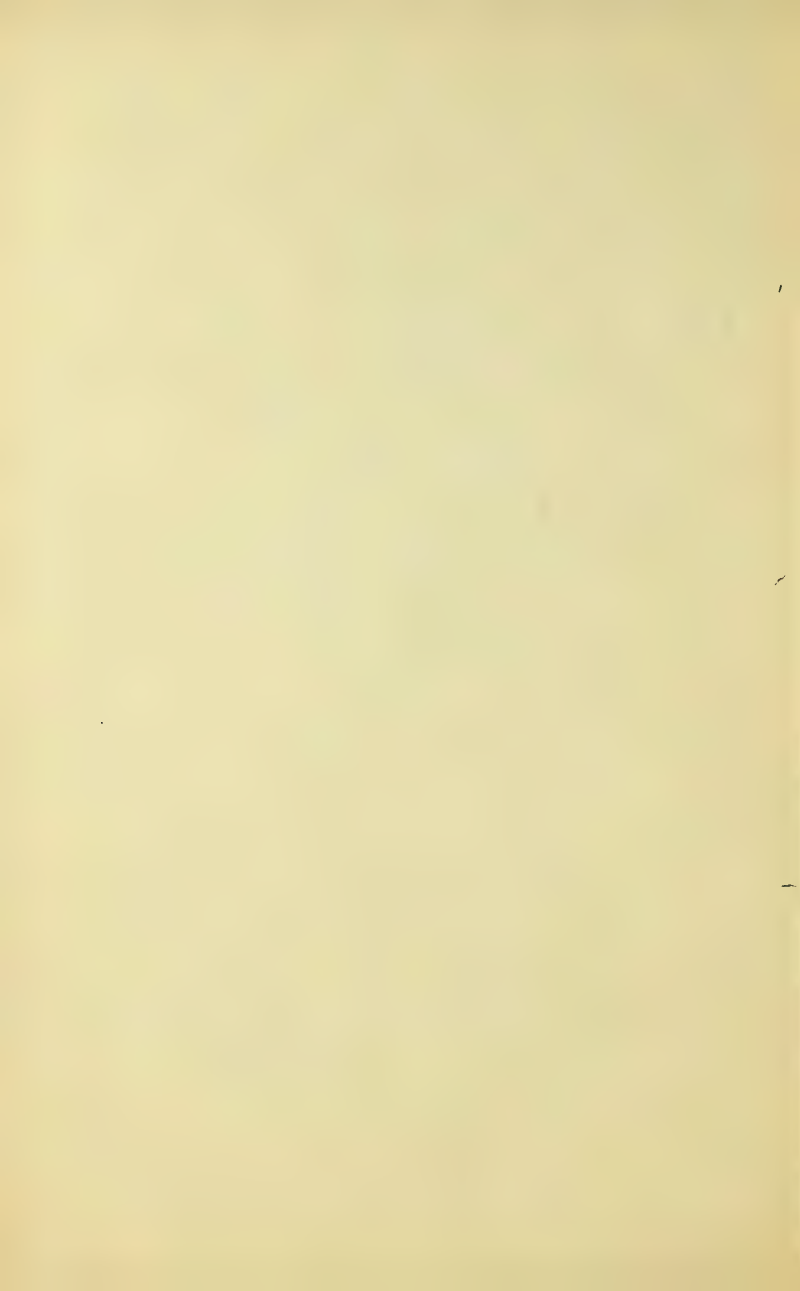
It is of great importance that we should have some remedy, whereby, when these insects do fall upon the hop vines in such myriads as they have done the past two years, we may be able to promptly destroy them.

As the lice remain stationary upon the undersides of the leaves and are so very tender and delicate that the slightest pressure suffices to crush and kill them, Mr. Kirby recommends to take the leaf between the thumb and finger, and move the finger so as to gently rub over the under surface of the leaf, whereby every aphid upon it will be destroyed. He thinks women and children can be employed for a small compensation to do this work, taking every leaf in succession between the thumb and finger, and thus wholly ridding the vines from these vermin. But we all know it will be an immense labor to thus take hold of every leaf upon the vines occupying whole acres of ground. Many of the leaves, too, are quite large, being five or six inches broad, and the finger is but three inches long. It will therefore require one hand to hold the leaf steady, whilst the thumb and finger of the other are drawn several times along it, mowing down the vermin by successive swaths. Moreover, the veins on the underside of these large leaves are studded with prickles, whereby I doubt if a dozen leaves can thus be rubbed over before the skin of the finger will be cut through to the quick. I need not specify other obstacles which occur to my mind, all concurring to convince me that this proposed remedy, of the success of which Mr. Kirby is quite sanguine, is wholly impracticable.

Washing and syringing the plants with strong soap suds has been often recommended for destroying the aphids upon them. I have recently been experimenting with this remedy, upon the plant lice which so badly infest the beautiful verbenas of our Flower Gardens, and I find it to be of but partial efficacy. It only kills the young, tender lice; those which are mature are so robust that they are not destroyed, even though the infested stems and leaves are immersed in a strong solution of soap.

There is one remedy, and one only, which we know to be efficacious and perfectly sure for destroying the different species of plant lice. This is the smoke of tobacco. It operates like a charm. It never fails. But to apply it, it is necessary to place a box or barrel over the plant, burning the tobacco in a cup underneath, until its smoke has filled the inclosed space

and penetrated all the interstices between the leaves. Hereby the rose bushes and other shrubs and plants in our gardens are with ease wholly cleansed from these vermin. To render it available for destroying these insects upon the hops, probably a piece of canvas or other large cloth can be thrown over them or some other apparatus devised whereby they can be fumigated for a few moments in the same thorough manner.



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**APPLE
TREE
PESTS**

[From Trans. N. Y. State Ag'l Society, 1853, Vol. 13th.]

APPLE TREE PESTS.

Schonherr's Weevil and the Orchard Moth.—Asa Fitch, M. D., Salem, N. Y.

Salem, N. Y., June 30, 1853.

Hon. B. P. JOHNSON: My Dear Sir—The Michigan insects reached me in safety. They pertain to the weevil family (CURCULIONIDÆ), and are one of the largest of that kind of insects which we have in this country. They are the *Pachyrhynchus Schonherri*, so named by the late Rev. Mr. Kirby, in honor of the Swedish entomologist Schonherr, who has devoted a great deal of attention to this family of beetles, so noted for the injuries which they inflict, and who has published several volumes upon them. Mr. Kirby's description of this species may be found in the Zoology of the Northern Parts of British America, vol. iv, page 103. It also appears, from the short description given in Turton's System of Nature, vol. 2, page 264, to be the species named *Curculio Noveboracensis*, or the New-York weevil, by Forster; but not having Forster's work at hand, I am unable to speak decidedly. It is rather a rare insect, I should judge, for I have never seen but three specimens of it heretofore. One of these I captured in this (Washington) county, twenty years ago. The others were sent to me, one from Long Island, and the other from Rhode Island. Mr. Kirby's specimens were taken in Canada.

This weevil, though variable in size, is commonly over half an inch in length, and is about two and a half lines broad. It is of a gray color, produced by short whitish hairs upon a black ground. Upon the thorax are three white stripes, more or less distinct, and upon each wing-cover are four white stripes which are interrupted by small black spots. These marks will suffice to distinguish

this from other insects. We have a long-horned beetle, the grub of which lives in pine timber—the *Rhagium lineatum*—which is much more common, and strikingly resembles this weevil in size, color and form, but is readily distinguished from it, by having a projecting spine, or tooth, on each side of the thorax.

Hitherto, so far as I am aware, nothing has been known respecting the habits of this weevil; and the facts mentioned by Mr. Wetmore, that it eats the young buds and tender twigs of the apple tree, causing them to wilt and die, passing from one bud to another, and, when satisfied, concealing itself under a leaf, until prompted by hunger, it crawls forth to take another repast, are very interesting, and will not fail to attract the notice of the fruit culturist. When these insects are present in numbers upon a tree, perhaps the best mode to get rid of them will be to spread sheets under the tree, and then shake the tree, or beat upon it with a pole. The insects, thus disturbed, will drop upon the sheets, and may be gathered up and killed by throwing them into a kettle of boiling water. They may then be fed to the hens.

Should a favorable season, or any other cause, lead to its becoming greatly multiplied at any time, it is easy to perceive that this weevil would be a great pest in our orchards. And that it will become thus multiplied, now and then, in particular districts, I do not doubt, history will show—this being the case with nearly all of our injurious insects. Commonly, their numbers are so few, that no notice is taken of their depredations. But, at times, they become so excessively numerous, as to commit great havoc and prove themselves a terrible scourge. An instance of this has recently been communicated to me. The common May beetle of our country, *Phyllophaga quercina*, as it is named in Dr. Harris's Treatise on Injurious Insects, (a work by the by, which should be in the hands of every farmer, gardener and fruit grower, now that a new edition has rendered it attainable to all,) is seldom noticed as being a depredator at least in this section of the State. Milo Ingalsbe, E-q., President of our county Agricultural Society, informs me that upon his place at South Hartford, he has about seventy plum trees, which were splendid-

ly in bloom on the 15th of May last, together with a number of cherry trees of several of the improved varieties. In the course of two nights afterwards, however, this May beetle suddenly hatched out in such astonishing numbers as to wholly strip these trees of their leaves, buds and blossoms, leaving many of them as naked as in mid-winter, and destroying all hopes of any fruit the present year.

But a still more remarkable instance of the excessive multiplication and consequent havoc caused by an insect not previously noticed, has occurred in this vicinity, since I received your letter. Indeed it surpasses every thing of the kind that has been hitherto experienced in this county since the date of its settlement. On the 19th instant, a man from Cambridge inquired of me whether I had observed the worms upon the apple trees, saying that all the orchards in that town were being stripped of their leaves. Next day, on going to my apple trees, I found the worm alluded to, upon all of them, committing great havoc; and a gentleman from Argyle informed me that within two and three days past they had been observed, overrunning all the apple trees there. Upon the 23d instant, the circuit court being in session in the village of Salem, I saw persons from most towns of the county, and learned that this worm was ravaging every orchard within our borders, without exception. Some idea of the value of our orchards and the amount of damage which this pest threatens to do us, may be formed from the fact, that two years ago, to supply the vacancies produced by trees that had perished, and to plant new orchards upon some farms, an agent from one single nursery disposed of young trees in this county, to the amount of \$10,000. As it well may, therefore, this worm at present forms the leading topic of conversation in every circle, and our newspapers are giving notices of it in their columns. And the crude and erroneous notions that are being formed and circulated respecting it, show, in a most humiliating manner, the gross ignorance which pervades our country, upon topics of this kind. One gentleman tells me, that in a conversation with the most noted and experienced nurseryman in our county, they had mutually come to the conclusion that this worm had been bred by what in his neighborhood is termed "the little green insect." On inquiry, I ascer-

tained that this little green insect, so called because they know no other name for it, was nothing more nor less than the *Aphis mali*, or Apple-leaf Louse. And the idea that this louse breeds these worms, is rather more wild than it would be to conjecture that fleas breed bed-bugs. One of our most intelligent and successful farmers, who sometimes wields his pen as well as his scythe and hoe, favored me with the *recherche* information, that this is the "canker-worm"—at least, said he, it is the very same worm which was called the canker-worm in Connecticut, when I was a boy. Had my good friend asseverated that the moon was made of green cheese, he would scarcely have surprised me more. I overheard another gentleman, a graduate of one of our best colleges, recommending to another similarly educated citizen, to bore his apple trees, fill the hole with sulphur, and close it by inserting a plug "made from the wood of the same tree." Methought he ought to have added, that the hole should be made with "a silver bullet," or at least that this operation should be done "in the old o' the moon."

Friend Johnson, posterity will only need what I have above stated, to show them that mauger all our vaunted light and intelligence, in this, one of the most important branches of natural science to the farmer, and one of the most interesting departments of nature's works to every studious and inquiring mind, our country, at the present day, is sunk in Egyptian darkness. In diffusive information, so far as respects Entomology, we are lagging far behind the subjects of several of the monarchical and despotic governments of the old world. In Germany and Prussia, countries which are regarded as much less enlightened than our own, not merely is a professor of this science deemed indispensable in every university, and every agricultural seminary, but its rudiments are taught in all their primary schools. In this country, on the other hand, such a thing as a course of lectures upon this science, has never yet been delivered, except perhaps in one or two of our universities. Indeed much of the very foundation of this science, upon this side of the Atlantic, is yet to be laid. Whole groups and families of our insects have never yet been examined. We have not even names by which to designate a considerable portion of our species. Take this apple tree

worm, for instance. It belongs to a family of insects, of which, in Great Britain, there are upwards of 300 species. Our own country, we may safely assume, contains at least double this number. And of our 600 American insects of this family, how many, think you, have been examined and described? So far as I am able to ascertain, there are *three species only*! In no other department of science is an exploration so urgently required, so loudly called for, as in this. Scarcely a week passes, but that one and another within the circle of my acquaintance, is coming to me with some insect which he has detected, preying upon some article of property; of which insect he is anxious to know the name, habits and remedies. Within the past forty-eight hours, one has brought me a worm which is infesting the roots of his squashes, melons and cucumbers, and has killed a large part of these plants in his and his neighbors' gardens; another has shown me some pea-pods, containing a worm which is devouring the young peas; a third has brought in some tomato plants, wilted and destroyed by a grub that has perforated the stalk; and a young lady has submitted to my notice some caterpillars, which she finds devouring her roses. Such facts forcibly show how much, how very much we need a thorough investigation of the Entomology of our country. It is indeed surprising that this branch of natural science, in an economical aspect second to no other in its importance, should have remained to this day so lamentably neglected. In that valuable series of volumes, the Natural History of the State of New-York, we are presented with a full description of every object in the animal, vegetable and mineral kingdoms, that exists within our borders—save only our insects. This most important hiatus remains to be filled, to complete that great work, and render it full and entire as it was designed to be. Each succeeding year is showing how urgently we need the information which this part of that work would furnish us. Why should its completion be longer delayed? The pecuniary loss which we shall sustain the present year, from this one insect which is now devastating our orchards, is probably greater than will be the whole cost of a survey of the insects of the State.

I have only space left to give you a short description of this apple tree worm, reserving a more extended account of it for a

future occasion, when I shall have had opportunities for studying its entire history.

It is a cylindrical caterpillar, somewhat resembling a span worm. It has sixteen feet, and is scarcely half an inch long when full grown. It varies considerably in its colors and marks, but is commonly of a pale yellowish or greenish hue, with a dusky stripe on each side of the back, running the whole length of its body. Above this, a narrower whitish stripe is more or less distinct, and along the middle of the back is a slender dusky stripe, between the whitish ones. With a magnifying glass some black dots, regularly arranged, may be seen along the back and sides, each dot having a short hair growing from it. The head is polished, and of the yellow color of bees-wax. Some worms are met with, however, having black heads. Whether these are a different species or not, can only be determined when the insect has attained its perfect state. They subsist upon the leaves, eating holes in them, and often devouring all except the coarse veins of the leaf. They also gnaw the young apples, causing them to wilt and fall from the tree. Our crop of apples for the present year is totally destroyed, and it is probable that many of the trees will die also, their foliage being wholly consumed, so that the trees look brown, as though they had been scorched by fire. When the tree is shook or jarred, many of the worms let themselves suddenly down from it, some to the ground, others suspended in the air by a fine thread like gossamer, which they spin. If it is menaced or annoyed when on the ground, with a wriggling motion it runs backwards and forwards with surprising agility. This worm evidently belongs to the family of leaf-rolling moths, (*TORTRICIDÆ*); and some of these worms may be seen hid in a slight covert which they form by folding the edge of the leaf, or folding it in a cylinder, or drawing two leaves together with their cobweb-like threads. Most of the worms, however, do not attempt to form any such covering for their concealment.

When the worm gets its growth, it crawls away from the tree, and under some leaf or other slight shelter on the surface of the ground, spins a little, oval, paper-like cocoon, of a gray color,

about 18-100ths of an inch long, and a third as broad, within which it changes to a pupa. Analogy teaches us that from this pupa will come a winged moth or miller, such as often flutters about our candles in the evening. This moth will lay its eggs upon the leaves or in the chinks of the bark of the apple tree; from which eggs another generation of these worms will be hatched. Dry, hot weather, in the month of June, it is certain, favors the multiplication of these worms. Before they were observed, it was currently remarked that such a spell of sultry, dry weather as we then had, was never before known so early in the season. On the night of June 23d we had heavy thunder showers, and the next day few of these worms could be found upon the trees. And though they are still present (June 30th) their numbers are now greatly reduced. Query—will not drenching the trees with water from a garden or fire engine prove to be the most effectual way of ridding them of these worms.

On beating and shaking the apple trees, I have repeatedly seen a moth fly from among the leaves, which I have little doubt is the parent of these worms. It is a delicate, pretty little insect, measuring six-tenths of an inch across its wings when they are spread. Its fore wings are of a shining pale yellow color, coarsely freckled with darker orange-yellow spots. The hind ends of its wings are occupied with a broad band of a purple color, blended with orange, and towards the outer or costal edge with a pale yellow. This band is double the width upon the costal that it is upon the inner side of the wing, and its anterior margin is slightly hollowed or concave; and running parallel with the anterior margin is a curved stripe, of an orange color, often tinged with purple, extending across the wing, slightly forward of its middle. The hind wings are grayish-brown, and white anteriorly on the outer side. This moth pertains to the genus *Argyro-lapia*, and the sub-genus *Lozopera* of the distinguished British Entomologist, Mr. Stephens; and as this species does not appear to have been hitherto described, I propose to call it the *Argyrolepia pomariana*, the specific name being derived from the Latin, *pomarium*, which, translated, will give us for the common name of this insect, the *Orchard Moth*, or, if we wish to be more definite, the *Orchard Argyrolepia*.

Our forests at present are infested to an unusual extent with a worm so exactly like that in the orchards, that every body regards them as being identical; nor have I been able to detect any marks by which they can be told the one from the other. Still, it is probable that they are distinct species. I have hitherto, in July and August, in different years, captured a moth in our forests, very like the Orchard Moth above described, and which I am inclined to regard as the parent of these forest worms. It is very slightly larger than the Orchard Moth; its fore wings are bright ochre-yellow, many of the scales sparkling with the lustre of burnished gold, and instead of being freckled, they are covered with crinkled, irregular, transverse lines of an orange color; the purplish stripe forward of the middle of the wings, is widened as it approaches the costal edge, and is prolonged upon this edge to the base of the wing; and posteriorly, instead of the broad band, there is only a spot of purple blended with orange, situated on the costal edge forward of the apex; the hind wings are white. In my collection, I have named this species *Argyrolepia sylvaticana* or the *Forest Moth*. We also have, in this State, two or three other species closely resembling those described, but I know nothing of their habits.

Yours truly,

ASA FITCH.

P. S. *July 23d.*—Informed that the number of the Journal of the New-York State Agricultural Society for August, had gone to press when the above communication reached you, and that it could not, therefore, appear until the issue of the succeeding number, as it was a topic in which our community was much interested, and erroneous views were being imbibed, I handed a copy of it to the Salem Press, in which newspaper it was published on the 12th inst., and copies were mailed upon the following day, to my several agricultural and scientific friends throughout the country. A few days after it was written, from the cocoons alluded to, I obtained the winged moth, from which it was evident that the species of *Argyrolepia*, which I had described, was produced by some other worm, as yet unknown, which probably infests our apple trees; whilst the worm which has done so much havoc this season, instead of pertaining to the family *TORTRICIDÆ*,

as all its habits so strongly indicated, in reality belongs to the TINEIDÆ, the family which includes the clothes moths and other species which subsist upon fur, grease, and various other articles of household stuff, and which make cylindrical burrows through the substances on which they feed, and have other habits, in the main very unlike those of this apple tree worm. The winged moths which this apple tree worm produces, belong to the genus named *Chatochilus*, by Stephens and Westwood, *Rhinosia*, by Treitschke, *Ypsolophus*, by Curtis, and *Aneychia*, (probably) by Hubner. Which of these several names was first published, and therefore has the right to be retained for our insect, I have not at hand the means for ascertaining; the name of Treitschke, however, must be rejected, Mr. Kirby having long since given the name *Rhinosia*, to a genus of weevils. The insects of this genus are chiefly distinguished by having their feelers clothed at base with very long scales, which project horizontally forward from the head, resembling a beak, and from the middle of the upper side of these scales, the last joint of the feelers is protruded upwards like a spur.

I had prepared a description of this moth, to be appended to the account which I had already given, but have to-day received from Dr. Harris a slip of a newspaper communication, dated the 19th inst., in which he names and describes it, from specimens which he has recently reared from some of the worms sent to him. He names it *Rhinosia pometella* (from the Latin *pometum*, a synonym of *pometarium*) or "The little *Rhinosia* of the orchard." But, for the reason above stated, I think we must adopt Mr. Stephens's generic name, and call our insect *Chatochilus pometellus*. Dr. Harris describes the species, as follows: "Forewings ash-gray, sprinkled with blackish dots, three of which, larger than the rest, are placed triangularly near the middle, a dusky, transverse band near the tips, and a curved row of seven black dots at the origin of the terminal fringe. Hind-wings, dusky, with a leaden lustre, black veins, and very long black fringes. Body and legs beneath, yellowish-white, with the lustre of satin. Expansion of the wings, five-eighths of an inch."

This description applies with sufficient exactness to the insect, which, however, is subject to great variety. I have a host of specimens before me, reared from the worms, and captured upon the wing every where in our orchards and forests, since the first week of the present month. On the 8th inst., a large white oak tree was observed, wholly stripped of its leaves, save merely a few fragments upon some of the lowest limbs; and at every step taken among the weeds and grass growing beneath this tree, a swarm of these moths would arise. An inspection of the several specimens in my possession shows that no two individuals are exactly alike in all their details. The general color of the forewings varies from tarnished cream-white to dark ash-gray, often with a pale purplish-red reflection, and mottled more or less with darker cloud-like spots of tawny yellowish-brown, which spots sometimes form four equidistant transverse bands. There are often two larger black dots slightly forward of the middle of the wing, and two others half way from these to the tip; but these dots are sometimes indistinct or wholly wanting. The seven black dots in a semicircular row, at the base of the terminal fringe, are almost always present. The veins of the hindwings are commonly darker than the general surface; the fringe is of the same color or sometimes lighter.

Associated with this species, both in our orchards and forests, may frequently be met with another moth of the same size and general appearance, and with its body and wings similarly colored and dotted, but having only the outer or costal half of the forewings of a dull cream-white or ash-gray color, whilst the inner half, the whole length of the wing, is of a brownish-black, the one color not shaded gradually into the other, but the transition being abrupt. I have named this the Comrade Moth, *Chatochilus contubernalis*, from the latin *contubernalis*, a comrade. The worms which this moth breeds, doubtless infest the apple and other trees the same as those of the other species. As already intimated, I propose preparing a full account of these insects, at an early day.

A. F.

NOTE.—A gentleman of Albany, who has a farm a short distance from town, discovered these worms upon his apple trees,

having destroyed the leaves upon two trees. He procured some whale oil soap, diluted it with water, and with a garden engine thoroughly drenched the remainder of his trees, and they were entirely preserved from the ravages of the worms. J.

[Letter from Dr. Thaddeus William Harris.]

CAMBRIDGE, MASS, July 23, 1853.

Hon. B. P. JOHNSON: Dear Sir—I have read, with some interest, your communication, on some insects that are injurious to the buds and young twigs of the apple tree in Michigan, contained in the Journal of the New-York State Agricultural Society, for July, and also the reply of Dr. Fitch, and his account of other destructive insects, printed in the Salem Press, of the 12th instant.

On the 22d of June, P. Barry, Esq., the editor of "the Horticulturist," sent to me a beetle and an apple tree twig, with the following remarks: "A gentleman in Wisconsin encloses me the weevil and piece of apple tree which accompany this. He says they are very destructive to his apple and pear trees, and occasionally to his plum and cherry trees. They attack the branch, generally, at the base of a young shoot, and eat it to the pith. He thinks it must operate in the night, as he can not find it in the day. Have you seen it in Massachusetts?"

This large weevil is the *Ithycerus Noveboracensis* of my catalogue of the insects of Massachusetts, printed in 1835, or the *Curculio Noveboracensis* of Forster's Centuria, printed in 1771. It is, undoubtedly, the same species that is referred to in your communication, and in Dr. Fitch's reply. Though not a very abundant species here, it is by no means rare, and it seems to have a wide range through the country, being found in most of the New-England States, in the Middle and in the Western States, in Canada and in Newfoundland. I have taken it in Massachusetts, on forest trees, particularly oaks, in June and July; but never met with it on fruit trees. Nothing is known to me of the habits of the insect in its early stages.

John Reinhold Forster, the first describer of this fine species, found it, as we learn from his "Catalogue," in "a most select and

numerous collection of American animals, belonging to a lady in Lancashire." This lady was the celebrated Anne Blackburne, eldest daughter of John Blackburne, Esq., of Warrington, England. She received it, with other insects, from New-York, whence it was probably sent by one of her brothers, who resided in this country. The specific name *Novaboracensis*, given to it by Forster, commemorates the place whence it came, and, having priority in point of time over other names subsequently given to the same species, must be retained. Gmelin, in 1788, and Olivier, in 1790, redescribed it under the same name.* It is the *Rynchites curculionoides*, of Herbst, who figured and described it in 1797, from specimens in a museum, rich in North American insects, belonging to Mr. Herschel, the court musician at Hanover, in Germany, a near relative of Sir William Herschel, the astronomer. In 1833, the Chevalier Schonherr, the author of an extensive work on the weevil tribe, gave it the name of *Ithycerus curculionoides*, unfortunately adopting the specific appellation bestowed upon it by Herbst, rather than the earlier one of Forster. Lastly, in 1837, Mr. Kirby, apparently not aware that the insect had already been made known, described it under the new name of *Pachyrhynchus Schonherri*, which must give place, as a synonym, to *Ithycerus Novaboracensis*.

By Monday's mail, I propose sending to you the Cambridge Chronicle of this date. You will find therein an account of the Palmer worm of New-England, which has lately done much damage to orchards in various parts of the country. I hear of it throughout the valley of the Connecticut, and nearly to the White mountains of New-Hampshire. It also prevails in the valley of the Housatonic, and as stated by my friend, Dr. Plumb, of Salisbury, and by Dr. Fitch, to a considerable extent in the valley of the Hudson. Should we have a second visitation of the insect during the present summer, orchards must suffer severely from its ravages. From the scientific name and description, which is given in the Chronicle, of the moth produced from it, you will

* In 1781, the Danish Naturalist, Fabricius, having met with a specimen from Newfoundland, in the collection of Sir Joseph Banks, described it under the name of *Curculio punctatulus*.

perceive that the latter is a very different insect from the two moths described by Dr. Fitch.

Respectfully, your friend and serv't,
THADDEUS WILLIAM HARRIS.

THE PALMER WORM.

BY DR. THADDEUS WILLIAM HARRIS.

During the month of June, a small worm, or naked caterpillar, has been observed on apple trees, in large numbers, throughout the greater part of New-England, and in the valley of the Hudson, in New-York. By some persons it was thought to be a new comer; and by others was mistaken for a second generation of the canker worm, which disappeared about the time that these smaller insects began their ravages. This, however, is by no means the first visitation of the insect in such unwelcome and destructive profusion. As long ago as the year 1791, it prevailed through many parts of New-England, during the month of June, and at that time received the name of the *Palmer worm*. Some account of its ravages in orchards, and even among forest trees, at that date, may be found under the head of *insects*, in the second edition of Dr. Deane's "New-England Farmer and Georgical Dictionary."

Communications concerning this insect, several of them accompanied by specimens, have been sent to me from Bradford, Andover, and Westford, Mass.; from New Boston and Keene, New-Hampshire; from New Haven and Salisbury, Conn.; and from Providence, R. I. Apple, cherry and plum trees in my own garden, also afforded me a few of the same insects, which were first observed there about the 10th of June. Within the past three weeks, numerous accounts of this supposed new or hitherto unnoticed depredator, have been published in all our agricultural newspapers. In some places, orchards have suffered from these insects in the same way and to as great an extent as from the ravages of canker worms; and in some cases, not only the leaves, but the young fruit has been destroyed by them.

These worms, or caterpillars, grow to the length of about half an inch. Though varying somewhat in hue, they are mostly of a pale yellowish green color, with two blackish lines along the top of the back, and a brownish head. Under a magnifier, a few short hairs can be seen on the body, arising singly from little black points, arranged in threes on each side of every ring; and there are usually two, more or less conspicuous, semicircular, blackish spots on the top of the first ring. They have sixteen feet; the first three pairs being jointed, and ending with a point or claw, the others, fleshy tubercles without proper joints. They are very impatient of being touched, and on being taken into the hand, move with great agility, and by jerks, both forwards and backwards. When the trees are shaken, the insects spin down, and hang suspended by threads. Probably most of them leave the trees in the same way, when their course is finished. In some places, it was observed, that they all took their departure during heavy showers, towards the end of June. My official engagements, at that time, prevented my observing their progress abroad.

All the specimens sent to me, that remained alive, together with a few from my trees, were put into a wide-mouthed bottle, and were supplied with leaves. About the 28th of June, some of these worms began to cover themselves with a transparent web, formed of a few delicate silken threads. One of them was transformed to a chrysalis, within its web, on the 5th of July, and became a winged moth on the 9th; having remained in the chrysalis state only four days. Others were more tardy in their transformations; and one still remains a chrysalis. More than half of the whole were unable to take this form, having perished in the worm state, from the attacks of an internal parasite, a minute grub, which, after preying on the vitals of its victim, left the body and spun itself a little oval whitish cocoon or pod, from which it emerged soon afterwards as a tiny four-winged ichneumon fly.

The chrysalis of the palmer worm is only one quarter of an inch long. It is of a pale brown color, and differs from that of

the common bud worm, in not having any transverse rows of teeth around the body. The moth is of an ashen gray color above, whitish, and lustrous like satin beneath. The fore wings are very narrow, and are sprinkled with a few black dots, three of which, near the middle, are larger than the rest. The hind wings are also narrow, blackish, and surrounded by very broad fringes. The antennæ are bristle-formed. The palpi, or feelers, project horizontally from the head, in the form of a brush-like snout, and from the middle of the upper side of each of them, arises the curved and pointed terminal joint, like a little spur. The tongue is spirally rolled, and when extended, measures about half the length of the antennæ. This little moth rests with the fore part of the body slightly elevated, the narrow wings horizontally incumbent upon the body, and the antennæ turned backwards, and lying straight upon the wings. The insect may now be seen on the wing, in the evening, soon after sunset; and it may also be found in considerable numbers, among the grass, at a somewhat earlier hour.

A scientific name and character, with the classification of this moth, remain to be given. It belongs to a group or tribe called *TINEADÆ*, and to the genus *Rhinosia* of Treitschke, or *Chatcchilus* of Stephens. Most of the insects belonging to the above named tribe, are of small size, and have diminutive specific names, ending in *ella*. As this insect frequents the orchard (in latin *pometum*) it may be called *Rhinosia pometella*, the little *Rhinosia*, or the little Snout-moth of the orchard. From other species of the same genus, it may be distinguished by the following characters: Fore-wings, ash-gray, sprinkled with blackish dots, three of which, larger than the rest, are placed triangularly near the middle; a dusky transverse band near the tips, and a curved row of seven black dots at the origin of the terminal fringe. Hind-wings, dusky, with a leaden lustre, black veins, and very long black fringes. Body and legs beneath, yellowish white, with the lustre of satin. Length, from the forehead to the ends of the closed wings, five sixteenths of an inch. Expansion of the wings, five eighths of an inch.

Some hope may be entertained that the little parasites, alluded to in the foregoing account, may tend greatly to check the future

undue increase of the palmer worms. Should a second generation of the latter appear during the present summer, or should we have another visitation of them next year, or at any future time, some means for arresting their depredations may become necessary. Showering the trees with soap-suds, or a solution of whale-oil soap, or with lime-water, dusting ashes or air-slacked lime on the leaves, when wet with dew or rain, or casting dry sand upon the trees, may be found serviceable. T. W. HARRIS.

Cambridge, Mass., July 19, 1853.

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**COUNTRY
GENTLEMAN**

The Naturalist.

ENTOMOLOGY.

No. 7.—The Wheat Thrips and Three-banded Thrips.

A letter from DAVID WILLIAMS, dated Geneva, Wisconsin, July 9th, says:

Enclosed I send you specimens of a minute little insect that is causing some alarm in this vicinity. They are found in all blossoms in great numbers. They first made their appearance about the middle of June, or at least, they were then first noticed, so far as I have heard. For about two weeks they were found in the blossoms of wheat and of clover, causing numbers of the blossoms to wither, and in some cases the kernel was also attacked. About a fortnight ago we had a very heavy fall of rain, which appeared to destroy them; but within a few days I have noticed their re-appearance in countless numbers. They are very nimble, requiring good eyes and ready fingers to secure them, and I was obliged mainly to my wife for the capture of those which I send you. There are other kinds which I did not succeed in capturing.

The insects alluded to in the above extract are so minute, that, had only two or three specimens been sent, I should have been unable to give any definite account of their species. An acknowledgment is due Mrs. WILLIAMS for the number of these insects which she inclosed in the quill—a task which the bungling fingers of a man could scarcely have accomplished. Among them I find specimens in all the stages of their growth, and am hence able to present a history and description of the species, sufficiently exact, I doubt not, to enable it to be recognized hereafter; although it is only from living specimens that such minute objects can be satisfactorily studied, and described with that precision and fullness which science requires.

Insects of the kind to which these belong, may be distinguished from all others by their wings, (see the accompanying figure, c,) which are long, narrow, and strap-like, and are fringed on both sides with long hairs like eye-lashes. Their mouths are also different from those of all other insects, being nearly intermediate between the *beak* or bill with which some of the Orders of insects puncture and suck the fluids on which they subsist, and the *jaws* with which those of all the other Orders gnaw the substances on which they feed. These insects originally formed the genus *Thrips*, placed by Linnaeus next to the plant-lice, in the Order *HEMITEPORA*; but as their wings and the structure of their mouths is so wholly unlike that of any other insects, naturalists of late rank them as a distinct Order, which is named *THYSANOPTERA*, i. e. fringe-winged. This Order contains the single family *THRIPIDÆ*, (currently written *Thripidae* by authors, but incorrectly,) which is divided into seven genera by the late Mr. HALIDAY, whose researches in this group were most extensive. About fifty species of these insects are known to the entomologists of Europe. They are all of small size, more than half of them being only about the twentieth of an inch in length, or less, and but few slightly exceed the tenth of an inch; though recently some have been found in Australia which are three times as large as any which were previously known.

Most of the species are found in the flowers of different plants. They feed upon the juices, and are very injurious, especially in hot-houses, causing small dead spots upon the leaves and flowers wherever they wound them. Some of them also infest melons and cucumbers. One species is very injurious to the olive trees in Italy. Another attacks peaches and other fruit to a mischievous extent. But the species which appear to do the greatest amount of damage is the grain Thrips (*T. cerealium*.) Our first accounts of this insect are from Mr. KIRBY, in 1796, (Linnaean Transactions iii, 246,) who however supposed it to be the *Thrips physapus* of Linnaeus, until Mr. Haliday showed it to be distinct from that species. An excellent history of this species is published by Mr. CURTIS in his paper on insects affecting the corn-crops, in the Journal of the Royal Agricultural Society, vol VI, p. 499; and figures of the insect and its dissected parts, in the several stages of its growth, from Mr. Haliday's Manuscripts,

are given in the List of Homopterous Insects in the British Museum, part IV, plates VI, VII and VIII. In the year 1805, one third of the wheat crop in the province of Piedmont is said to have been destroyed by this seemingly insignificant little insect. Mr. Kirby says it is by far the most numerous of any insect upon the wheat in England; he does not think he ever examined an ear of wheat without meeting with it. He says it takes its station in the longitudinal furrow of the seed, in the bottom of which it seems to fix its beak, and probably sucks the milky juice which swells the grain. Thus by depriving the kernel of part, and in some cases perhaps the whole of its moisture, it causes it to shrink up and become what the farmers call "pungled." According to Vassalli Eandi, it also gnaws the young stalks just above the knots, causing the ear to become abortive in consequence of these wounds. It is late sown wheat which is reported to be chiefly injured by this insect; and early sowing is the only remedy which I find spoken of by those who have written upon it.

Our American species of this order of insects are probably as numerous as those of Europe, but none of them have been examined and described, except one which occurs in small hollows gnawed in young apples, of which some account is given in my Report upon the Noxious Insects of New-York, just published. I have repeatedly noticed different kinds of these insects upon growing wheat, but not in such numbers that I supposed they were doing any appreciable injury to the crop. The species which I have found most common upon wheat in my own vicinity, will be found described at the close of this paper. Dr. HARRIS has also seen the larva of a Thrips which he supposes to be the *T. cerealium*. He merely states that it was orange-colored; and as the larva of *T. cerealium* has a black or dusky head and two spots of the same color on the fore part of the thorax, and its antennæ and legs have alternate blackish and whitish rings, it is more probable that his specimens were the same species as those now before me from Wisconsin. Be this as it may, the communication from Mr. WILLIAMS is important, as making us acquainted with an enemy of the Wheat crop of which we heretofore have had no definite knowledge, and which will undoubtedly at times be quite detrimental in the wheat-growing districts of our country.

Although this species, like many others in this Order, occurs upon the flowers of different plants, it is upon wheat, in all probability, that it will be oftenest noticed, and to which it will prove most injurious. It may therefore appropriately be named the Wheat Thrips, (*T. tritici*.)

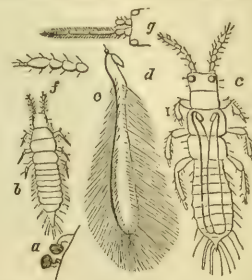
Attached to the surface of the shrivelled flower-leaves in the quill, I find what I doubt not are the eggs of these insects, (see figure, a.) They are so minute as to be wholly invisible to the naked eye, except when placed upon clean white paper, when they can be merely discerned, appearing like an atom of dark-colored dust. Under the magnifier they are discovered to be of a bright red color, like particles of sealing-wax, and of an oval or almost globular form; and they are attached to the leaf by a short, thick, crinkled stalk or stem, which is of a dull white color.

The larvæ, (figure, b,) resemble the perfect insects, except that they are wholly destitute of wings, and are smaller and softer, with the several segments of the body more equally and distinctly separated from each other by transverse, constricted lines. They are throughout of a bright orange-yellow color, of the same hue as the worms of the Wheat-midge, which worms, however, small as they are, appear like giants when placed by the side of these larvæ. Two minute black dots upon the anterior end of the head, are the eyes. The legs and antennæ are much like those of the perfect insects, except that they are shorter. The two minute joints at the end of the antennæ, (see figure, f,) can frequently be perceived in the larva state of these organs.

During this state, the insects of this order are very

nimble, skipping and throwing themselves to a distance by striking their abdomen suddenly against the surface upon which they are placed. In their pupa state they are much more slow and sluggish in their motions, and become quite active again when they reach their perfect state. The pupa are like the perfect insects in size and shape, except that their wings are short and rudimentary. At first they are merely oval scales, situated upon each side of the two last segments of the thorax. Subsequently they become more developed, so that they reach to the middle of the abdomen or slightly beyond, but they are still incapable of being used for flying. The species under consideration, when in its pupa state, is of the same yellow color as when a larva, but the abdomen, at least towards its base, is paler than the thorax.

The perfect insect (figure, c) is but four hundredths



of an inch in length. Its length is indicated by the short line at d, in the annexed cut. It is thus a fourth smaller than *Thrips cerealium*, and instead of being black like that species, this retains the yellow color which it has when a larva, the head and thorax (which includes the three large segments next to the head, from each of which a pair of legs arises, as shown in the figure) being of a deep orange yellow, or like the yolk of an egg, whilst the abdomen is paler and the legs are whitish yellow. The antennæ (the apical joints of which are represented more enlarged at f) are whitish, tinged towards their tips with dusky. The fringes of the wings are also dusky. The fore legs are shorter but no thicker than the others. All the details of its structure are so plainly shown in the accompanying figures, that a more particular description is unnecessary.

The species which I have noticed as the most common upon wheat in Washington county, New-York, is described in my manuscripts under the name of the Three-banded Thrips (*Colothrips trifasciata*). It is clearly distinct from the three European species of this genus, though nearly related to the *C. fasciata*, Linn. It is nearly double the size of the Wisconsin Wheat Thrips, being seven hundredths of an inch in length, and is so distinctly marked that with the aid of a magnifier, even preserved specimens can be readily distinguished. It is of a black color, polished and shining, with the third joint of its antennæ white, and its wings black or dark smoky brown with three broad white bands, whereof one is upon the base, another across the middle, and the third, which is somewhat narrower, upon the tip. The wings show two longitudinal veins, but no transverse ones were noticed upon them, nor could I discern any fringe upon either their outer or their inner margin. The fore legs are larger than the others, and the antennæ (see figure, g.) instead of arising far apart as in most of the species I have examined, come out from the front of the head close together, and are composed of only five principal joints, of which the two first are short and a third thicker than the others, which are long and cylindrical, the last one gradually tapering to a slender point, its apical portion being divided into small indistinct segments.

This species is common upon wheat as early as the first of June. When the grain ripens it probably forsakes it and becomes dispersed upon plants which flow-

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er later in the season; for I have met with it upon flowers of tany the last of July. ASA FITCH. November, 15, 1855.

Woman in Barbarism.

We have already referred to a very curiously interesting article in the last number of the *Westminster Review*, on "The Position of Woman in Barbarism, and among the Ancients." We copy a few of the most striking passages:—

"A betrothed New Zealand girl not only becomes 'tapped' to her future husband, and to him alone, but even if he should die, no other man can make a proposal to her. As may be supposed, a severe check is thus imposed on the growth of the population. Though differing in form, yet essentially similar in practice and effect, is the universal custom of the Hindoos (commended by the Abbe Dubois!) according to which, widows may not marry again, 'even when they lose their husbands at the age of six or seven; for it is not rare to see widows no older, particularly among the Brahmins, when an old man of sixty, or upwards, takes for his second wife a child of that tender age.'"

"Of all nations the Chinese carry out the system of early betrothal most completely: parents in China not only bargain for the marriage of their children during their infancy, but while they are yet unborn. 'Two friends will make a solemn promise, or even take an oath, to unite in marriage the children of different sexes that may be born to them; and the solemnity of the engagement is marked by their tearing, reciprocally, a piece out of their tunic, and giving it to each other.' In curious contrast to this custom, we find a still greater stretch of parental assumption among the Mongols, who not infrequently betroth or marry their children after they are dead! The contract having been regularly drawn up, and rude representations of the various gifts, usually received by the parents of the bride when a living couple is betrothed, having been made, they commit the whole to the flames, and thus, as they believe, convey them through the medium of the smoke, to their children in the other world, that they may become husband and wife in due form. The parents of each, after this, consider themselves as mutually related, just as if a real connection had taken place between their living children. Among the Moslems, 'the marriage contract is often performed several years before the consummation, when the two parties are yet children, or during the infancy of the girl.' If, when a daughter is betrothed during infancy, the contract should not assume the form of actual sale, it is, nevertheless, usual for the bridegroom, at the time he acquires possession of his bride, to pay into the hands of her father a sum considered equivalent to the current value of a wife."

"The life of an Australian beauty is graphically portrayed in the following passage:—

"Should a female be possessed of considerable personal attractions, the first year of her life must necessarily be very unhappy. In her early infancy she is betrothed to some man, even at this period advanced in years, and by whom, as she approaches the age of puberty, she is watched with a degree of vigilance and care, which increases in proportion to the disparity of years between them; it is, probably, from this circumstance that so many of them are addicted to intrigues, in which, if they are detected by their husbands, death, or a spear through some portion of the body, is their certain fate; indeed, the bare suspicion of infidelity upon their part, is enough to insure to them the most cruel and brutal treatment. For these causes, during youth they are compelled, whether pregnant or not, to accompany their husbands in all their excursions, and are thus subject to violent and continued exercise and fatigue at periods when repose is indispensable."

"But, even supposing a woman to give no encouragement to her admirers, many plots are always laid to carry her off, and in the encounters which result from these, she is almost certain to receive some violent injury; for such of the combatants orders her to follow him, and in the event of her refusing, throws a spear at her."

"The early life of a young woman at all celebrated for beauty is, generally, one continued series of captivity to different masters, of ghastly wounds, of wanderings in strange families, of rapid flights, of bad treatment from other females amongst whom she is brought a stranger by her captor; and rarely do you see a form of unusual grace and elegance, but it is marked and scarred by the furrows of old wounds; and many a female thus wanders several hundred miles from the home of her infancy, being carried off successively to distant and more distant points."

"But the most famous instance of regular international trade in women, is that carried on at Constantinople—the supply being chiefly obtained from Georgia and Circassia. And such is the power of custom,

that the Circassian damsels are nothing loth to be thus exported from their mountain homes. Six Circassian girls, from twelve to fifteen years of age, intended for the slave-market of Constantinople, were found on board a Turkish vessel, recently captured by the Russians. They proved to belong to a race with whom Russia was at peace. The Russian general, therefore, ordered them to be informed that the choice was open to them, to be sent back to their homes with the price of their own race' (also one of the captives,) 'to marry Russians and Cossacks of their free choice, to return with Baron Haxthausen (a spectator of the scene) to Germany where all the women are free, or, lastly, to accompany the Turkish captain, who would sell them in the slave-market at Constantinople. They unanimously, and without a moment's consideration, exclaimed, 'To Constantinople to be sold!'"

"The son of a chief (of the Puncash tribe,) a youth, eighteen years old, wishing to connect himself with some of the most influential men of the tribe, for the sake of securing their countenance, had an interview with one of the most distinguished, and made an arrangement with him for the hand of his daughter, whom he was to receive on a certain day, at a certain hour, and for whom he was to give two horses, a gun, and several pounds of tobacco. It was enjoined on the father, as a condition of the espousal, that he should keep the contract a profound secret. In like manner, he soon made similar arrangements with three other leading men of the tribe, each of whom had a young and beautiful daughter of marriageable age. To each of the fathers he promised two horses, and other articles, as stipulated for in the first instance, laying on each the same injunctions of secrecy, until he should announce to the whole tribe that he was to be married. At the time appointed, they all assembled, ignorant of the fair hand that was to be placed in his. He got some of his young friends to lead up the eight horses; he then took two of them, with the other presents agreed upon, and presenting to the first of the chiefs with whom he had made the compact, and whose daughter was standing by his side, said to him, 'You promised me the hand of your daughter on this day, for which I was to give you two horses,' etc. The father assented, receiving the presents, and giving his child, when some confusion ensued from the simultaneous remonstrances which were suddenly made by the other three parents who had entered into similar contracts. As soon as they could be pacified, and silence could be restored, the ambitious young chief exultingly replied, 'You have all acknowledged, in public, your promises to me, which I shall expect you to fulfil. I am here to perform all the engagements which I have made, and I expect you all to do the same.' No more was said. He led up the two horses for each, and delivered the other presents, leading off to his wigwam his four brides!"

"Throughout the broad expanse of Asia, from time immemorial, the lot of woman has been that of wretched personal slavery and social abasement; but, in China, her miserable condition seems to touch the extreme that is possible for human nature to endure. She is sold to her future husband without even being consulted on the subject; to inform her of so much as his name, is considered quite superfluous, and in the family of her purchaser she is expected to obey every one without exception. According to an old Chinese writer, 'The newly married wife would be but a shadow and an echo in the house.' Her husband can strike her with impunity, starve her, sell her, and even let her out for a longer or shorter period, as is done in the province of Tche-Kiang. The number of women driven to suicide by their accumulated sufferings, is very great. When a Chinaman thus loses his wife, he usually manifests, we are told, 'a great deal of emotion; for, in fact, he has suffered a considerable loss, and will be very anxious to buy another wife.' The mean, bullying selfishness of the Chinese of the present day, towards their women, is but a counterpart of their inhuman cowardice and readiness to sacrifice them to their conquerors in former times."

"The position of woman in Ancient Assyria is abundantly illustrated by the extraordinary method adopted to dispose of them in marriage. Speaking of Assyrian customs, Herodotus says, *natively*:—*The wisest, in my idea, is this, which, I understand, holds, also among the Venetians of Illyria.* Whatever maidens might be of marriageable years, were all collected and brought into one certain place, around which stood a multitude of men. A crier called up each girl separately, and offered her for sale; he began with the prettiest of the lot; and when she had found a rich bidding, he sold her off; and called up another—the next he ranked in beauty. All these girls were sold off in marriage; the rich men, that were candidates for a wife, bade against one another, for the handsomest; the more humble classes, desirous of getting partners, did not require, absolutely, beauty, but were willing to take even the ugly girls for a sum of money. Therefore, when the crier had gone through the list of the prettiest women, and disposed of them, he put up the ugliest, or some one that was a

cripple, if any there were, and offering to dispose of her, called out for the bidder that would, for the smallest sum, take her to live with him; so he went on till he came to her that he considered the least formidable. The money for this was got by the sale of the pretty maidens, so that the handsome and well-shaped gave dowries to the ugly and deformed."

"Marriage is, to a Hindoo, the great—the most essential of all objects. A man who is not married is considered to be a person without establishment, and almost as a useless member of society. Until he arrives at this state, he is consulted on no great affairs, nor employed on any important trust. In short, he is looked upon as a man out of the pale of nature. It is by means of his wife that a man enjoys all earthly happiness. A man without a wife is an imperfect being. The young Brahmin is not only urged to marry, but the divine lawgiver—the son of Brahma—'directs him in his choice: 'A twice-born man' must 'studiously avoid the ten following families,' be they ever so rich:—'The family which has omitted prescribed acts of religion; that which has produced no male children; that in which the *Veda* had not been read; that which has thick hair on the body; and those which have been subject to certain specified diseases. 'Let him not marry a girl with reddish hair; * * nor one immoderately talkative; * * nor one with any name raising an image of terror. Let him choose for his wife a girl whose form has no defect; who has an agreeable name; who walks gracefully, like a pheasant, or like a young elephant; whose hair and teeth are moderate respectively in quantity and in size; whose body has exquisite softness.' Though a Brahmin may be 'in the greatest difficulty to find a suitable match,' he must not think of a woman of an inferior caste as his first wife; 'A Brahmin, if he takes a *Sudra* to his bed, as his first wife, sinks to the regions of torment. * * For the crime of him, who thus illegally drinks the moisture of a *Sudra*'s lips, the law declares no expiation.'"

Beautify your Home.

Every man should do his best to own a home. The first money he can spare ought to be invested in a dwelling, where his family can live permanently. Viewed as a matter of economy, this is important, not only because he can ordinarily build more cheaply than he can rent, but because of the expense caused by frequent change of residence. A man who early in life builds a home for himself and family, will save some thousands of dollars in the course of twenty years, besides avoiding the inconvenience and trouble of removals. Apart from this, there is something agreeable to our letter nature in having a home that we can call our own. It is a form of property that is more than property. It speaks to the heart, enlists the sentiments, and emboldens the possessor. The association that springs up around it, as the birthplace of children,—as the scene of life's holiest emotions,—as the sanctuary where the spirit cherishes its purest thoughts, are such as all value; and whenever their influence is exerted, the moral sensibilities are improved and exalted. The greater part of our happiness in this world is found at home; but how few recollect that the happiness of to-day is increased by the place where we were happy on yesterday, and that, incessantly, scenes and circumstances gather up a store of blessedness for the weary hours of the future! On this account we should do all in our power to make home attractive. Not only should we cultivate such tempers as serve to render its intercourse amiable and affectionate, but we should strive to adorn it with those charms which good sense and refinement so easily impart to it. We say easily, for there are persons who think that a home can not be beautified without a considerable outlay of money. Such people are in error. It costs little to have a neat flower-garden, and to surround your dwelling with those simple beauties which delight the eye far more than expensive objects. If you will let the sunshine and the dew adorn your yard, they will do more for you than any artist. Nature delights in beauty. She loves to brighten the landscape and make it agreeable to the eye. She hangs the ivy around the ruin, and over the stump of a withered tree twines the graceful vine. A thousand arts she practices to animate the scene and please the mind. Follow her example, and do for yourself what she is always laboring to do for you. Beauty is a divine immortality. It is one of God's chosen forms of power. We never see creative energy without something beyond mere existence, and hence the whole universe is a teacher and inspirer of beauty. Every man was born to be an artist so far as the appreciation and enjoyment of beauty are concerned, and he robs himself of one of the precious gifts of his being if he fails to fulfil this beneficent purpose of his creation.—*Southern Times.*

SIGNS OF FALL.

The biting airs the shrinking flesh appeal
By sharp incisions,
And every thing proclaims the approach of fall,
Except provisions.

ENTOMOLOGY.

No. 8.—Cut-worms.

L. A. BROWN, Esq., of West Haven, Ct., under date of July 21st, 1855, writes to the editors of the Country Gentleman as follows:

Will you or some of your readers inform us, through your paper, how the *Cut-worm* is produced—whether from the miller, or whether they bring forth their young like the rabbit or any of the animal creation? I would like to know also whether one kind of soil more than another, or whether different manures, coarse or fine, have a tendency to increase their numbers. Their name is legion with us, this season. More than thirty have been found around one cucumber hill. Whole fields of cabbages have been cut down in a night. The subject of their production has been up for discussion, but no one seems to know, nor is there any author that we have that throws any light on the subject. I have had some experience relating to their production, but it is so at variance with my previous ideas that I want more light before publishing it.

Whether the cut-worm is more numerous in one kind of soil than another, I am unable to say. The soil of my own neighborhood is a gravelly loam, and in this the cut-worm is common. I presume it is equally common in sandy and clay soils. In one instance, at the bottom of a bowl-shaped hollow, where the soil partook of the nature of a stiff clay, a number of cut-worms were found, when there were scarcely any in the surrounding gravelly soil; but it was probably the more juicy, tender growth of the corn in this damp hollow, which caused the worms to gather there, rather than the nature of the soil.

I do not think the fertility of the soil, or the kind of manure which is applied to it, has any influence upon these worms, except in making the plants grow more succulent, for it is vegetation of this character which appears to be their favorite food. We all know these worms are common in our highly manured gardens. And I have never found them more plenty than on one occasion among beans planted upon a hill-side, so barren that it was thought nothing else could be raised there.

The biography of these worms is briefly as follows: The parent insect drops her eggs upon the ground, the latter part of summer. These soon hatch, and the young worms which come from them, crawl into the ground and feed upon the roots and tender shoots of herbaceous plants. When cold weather arrives they descend a few inches below the surface and there lie torpid during the winter, and renew their activity when spring returns. It is not until they have nearly completed their growth, in the month of June, that they show that habit which renders them so injurious, and has acquired for them their name, "cut-worm." They then crawl from the earth, by night, and with their sharp teeth cut off the young succulent plants of maize, cabbage, beans, &c., almost as smoothly as though it were done with a knife. When daylight approaches, each worm crawls into the ground again, entering it within a few inches of the plant it has severed—the newly disturbed and rough appearance of the dirt showing the exact spot where it has gone into the ground, and rendering it easy to uncover and destroy the worm. Having got its growth it forms a little oval cavity in the ground, within which it lies and changes to a pupa or chrysalis. In this state it has some resemblance to a long slim egg of a chestnut brown color, having several impressed rings or joints towards its pointed or tail end. From this pupa, in three or four weeks, hatches the perfect insect, which is a dark colored miller or moth.

Every observing person is aware there are several kinds of these worms, differing from each other in the color of their heads, the stripes upon their bodies, and in their habits. But unfortunately we do not yet know which particular species of moth it is which either of the kinds of these worms produces. I have repeatedly endeavored to breed the moth from these worms, by placing them in cages into which I transplanted young corn, beans, &c., and also by placing bell-glasses over corn hills where worms had buried themselves. But I have never been able to succeed. The worms on finding themselves imprisoned, refuse to eat, and hurriedly crawl around and around the inner side of their prison, night after night, until they literally travel themselves to death. They are by no means such sluggish, stupid creatures as one would suppose from seeing them in the day time. By night they are as active as any other animal whose skin is stuffed and distended with food as theirs is. They are evidently able to crawl quite a distance in a single night. It is the common opinion that they are always bred in the ground near the spot where they do their mischief. But I suspect they are everywhere wandering about, nightly, in search of such tender, succulent plants as will furnish them a dainty repast, and that they thus in many instances enter our gardens and corn-fields from the surrounding enclosures. They certainly, if so inclined, could travel across the largest of our arable fields in a few hours.

The following short descriptions of the different kinds of cut-worms which have fallen under my notice, and their habits, I extract from my manuscripts. All these worms, except the White one, are about an inch and a quarter in length when at rest, and an inch and a half when crawling. They all have four polished elevated dots upon each segment, on the back, and a few others which are less distinct, upon the sides, each dot bearing an exceedingly fine hair.

The RED-HEADED CUT-WORM is of a dull pale brown color, without any stripes, and may be distinguished from all the other kinds by its head, which is of a tawny red color, instead of smoky yellowish as it is in each of the following, except the last one. Common in cornfields, cutting off the plants slightly below the surface of the ground, and thus always destroying them. On Staten and Long Island, I am told, this species is popularly named the "Tiger worm," from its destructive habits, and that the name cut-worm is there applied only to the next species.

The STRIPED CUT-WORM is dirty whitish or pale smoky, with darker brown stripes, of which there are two along the back and three broader ones along each side; dots black, as they are in the preceding species, but not so minute. This is the most common kind in cornfields, cutting off the plants half an inch above the ground; hence the stalk frequently shoots up again, from the middle of the stump. This occasionally occurs among beans also. It buries itself but slightly, and may sometimes be found with half its back exposed, even though the sun be shining clear and hot.

The FAINTLY-LINED CUT-WORM is dull brown, with very faint pale longitudinal lines, and the polished dots but little darker than the general color. Found in cornfields, but more commonly in gardens among cabbages and sometimes among onions. Buries itself but slightly.

The WHITE CUT-WORM is smaller, being scarcely an inch long when at rest. It is dull white, with black dots and no stripes or lines except a row of very faint brownish touches along the upper part of each side. It is rare, a single individual being occasionally found among corn and beans.

The BLACK-HEADED CUT-WORM is dull dark brown, with faint traces of pale lines, and its head deep black. This is probably what is named the "Black worm" in some neighborhoods. It is the most common kind among beans, cutting them off slightly below the surface, and drawing the severed stem into the hole where it buries itself, and there feeding upon it during the

day, till the whole is devoured, or only pieces of the wilted leaves remain, plugging up the entrance of the hole. Either the Striped or the Lined cut-worm frequently treats corn in this same way. Hence the stump may often be found without any wilted leaves lying near it.

There are doubtless other species of cut-worms which have not yet presented themselves to my notice, my investigations of these insects being as yet far from complete. My young cucumbers being always enclosed in boxes open at the bottom and top, are never molested by cut-worms, and seldom by other insects; hence I know not the worm which depredates on them.

As already stated, the particular species of moth or miller into which either of our American cut-worms changes, has never been ascertained. Most of the species, however, pertain to the genus *Agrotis*, of the family NOCTUIDÆ, or Owllet-moths. In England the insects of this genus are named "Dart moths," from a peculiar spot or streak which many of them have near the base of their fore wings, resembling the point of a dart or spear. Much the most common species of this genus in the state of New-York, can be nothing else than the Gothic Dart (*Agrotis subgothica*) of the British entomologists. This was first described by Mr. Haworth in the year 1810, and is current in all the books as a British insect. Mr. Stephens, however, says it is very rare, only three or four specimens having been found in England. I doubt not it is an American insect, the eggs or larvæ of which have accidentally been carried to England, probably in the earth in which plants have been transported thither. Here, it is one of the most common of those moths which come in at the open windows of our houses in warm summer evenings, attracted by the lights of the candles. I have thus taken more than a dozen specimens in an hour. It begins to appear early in July and continues till September, and in Illinois I met with it on one of the last days of this month. Its wings when spread measure from over an inch and a quarter to an inch and a half across. It is of a grayish-brown color, and the four wings have a broad whitish stripe on the outer margin from the base to beyond the middle, and another branching from this and running through the centre of the wing. Between these whitish stripes is a pale triangular spot having its outer side wholly confluent with the outer stripe, and back of this is a second pale spot which is kidney-shaped, the space before, between and behind these spots being black or dark brown. And extending from the base of the wing along the inner side of the inner stripe is a broad black or dark brown streak (representing the dart head above alluded to,) which streak is crossed by two slender pale lines, these lines not parallel with each other. This last mark with the two pale lines across it, will alone distinguish this from all our other moths.

Our next most common species is the Devastating Dart (*Agrotis devastator*), thus named by Mr. Brace in the year 1819, in a short article upon the cut-worm, published in the first volume of Silliman's Journal, page 157. And it appears to be this same species, which has recently been figured and named *Agrotis Marshalliana* by Mr. Westwood, from a single specimen found in England by T. Marshall, Esq., (Humphrey's British Moths, vol. i, p. 122.) In this species the wings when spread are from an inch and a half to over an inch and three-fourths across. The fore wings are grayish brown, and are crossed by four equidistant wavy whitish lines, which are edged more or less with blackish. But commonly only the last one or two of these lines can be perceived; and the last line has a row of blackish triangular spots, like arrow heads, along its anterior side, their points directed towards the base of the wing. Often these spots are so obliterated that only one or two of the middle ones can be discerned in a particular reflection of the light. But it is by these spots more than any other character that I discriminate specimens of this species; for it is variable, with its marks obscure and more or less obli-

rated, from its wings when flying having been fluttered and rubbed against grass, leaves, &c., as is apt to be the case with most of the insects of this order.

Although more than a dozen other species of Dart-moths are known to me, the two now described will suffice as examples of the insects whose eggs produce the cut-worms. Though so common, they are seldom seen in the day-time, being then at rest, secreted in dark situations, such as the crevices in stone walls and the cracks under the clapboards of buildings. By looking behind the window-shutters of my office, at any time in July or August, I am able to obtain specimens of the Devastating Dart and one or two other less common species.

As to the best modes for subduing the cut-worm and guarding against its ravages, only a few words will be necessary, as this topic has been so often discussed in our agricultural journals. Commonly only one or two stalks in a hill of corn or beans are cut off, and the remainder is left unmolested, the worms appearing to require but one or two meals of this kind, just as they are on the point of changing to pupæ. It is well, therefore, to plant so much seed as will enable these depredators to glut their appetites without taking all the stalks in the hill. Observation has long pointed to this as a precaution which should always be taken. Hence the old rule as to the number of kernels which should be planted in each hill of corn—

"One for the black-bird and one for the crow,

Two for the cut-worm and three to grow."

But occasionally these worms are so numerous that active exertions must be put forth to save the crops from destruction. And general experience shows we have as yet only one resort which is perfectly certain and reliable, to wit, digging the worms out from their retreats and destroying them. To go over a large corn-field carefully, on this errand, and promptly as the exigency of the case demands, is quite a formidable task. Still, every one will perceive on a moment's reflection that when this measure is necessary to save the crop, the same amount of labor can scarcely be bestowed elsewhere so profitably.

It however is very desirable that some effectual and more speedy mode of combating these insects should be discovered. So long ago as 1817, a notice in the newspapers stated that making a few holes about the hills with a sharp stick was an easy way to entrap these worms, as they would fall into such holes, and being unable to crawl out of them, would perish—some of the holes being found half full of worms thus gathered in a single night. A writer in the *Michigan Farmer*, whose communication was fully noticed in the *Country Gentleman* of June 7th, 1855, bears strong testimony to the efficacy of this measure. From my own observations it appears that these worms are never able to crawl the length of their bodies up a perpendicular bank of earth, before they loose their foothold and fall. I hence presume the measure above spoken of will be effectual. Indeed, if my supposition is correct, that these worms mostly come from the surrounding fields, to the places where we notice them, I have thought that a single deep furrow, struck around the outside of a field or garden, when the worms are first beginning to appear—any break in the land-side of the furrow being repaired with a hoe—would form a barrier over which it would be impossible for them to make their way—thus protecting the whole field effectually and at a very trifling cost. I hope in one or two summers to complete my observations so that I can speak with more confidence upon this subject than I am able to do at present. ASA FITCH. Salem, N. Y., Feb. 20

WATERTOWN.—The citizens of this town have held a meeting, and resolved to accept the terms on which it is proposed to hold the next State Fair at that place. The necessary committees were appointed, and it is believed they will have every thing ready to complete the arrangements at the meeting of the Executive Committee in April.

ENTOMOLOGY.

No. X.—Horcr in Apple Trees—The Duprestis.

In the fifth volume of the Country Gentleman, page 345, W. M. T. of Jessamine county, Ky., asks for information respecting a worm which has done great injury in his orchard of young apple trees, some of the trees being entirely killed by it. He has not been able to find this worm; but we gather from his account that it invariably commences its depredations upon the south side of the young tree, generally about a foot above the ground, and feeds upon the inner bark and outer wood, filling the cavity which it makes with its castings, and at the end of its burrow it penetrates inward into the solid wood, the only external indication of its destructive work being the dark color of the outer surface of the bark.

A letter from S. MOORE, Esq., of Kensington, Conn., states that a worm answering in all respects to the above account, is at present very troublesome in his and other orchards in his vicinity. He has repeatedly found the worm in its burrow under the bark. It is usually from a half to three-fourths of an inch in length. He and others are very desirous to know what insect this is, and what are its habits.

We wish Mr. M. had sent us specimens of this worm, and of the wood showing its operations. We feel much like the Israelites under their Egyptian task-masters—bricks required of us, and no straw given us with which to make them. We have never seen an apple tree depredated upon in the manner above described. From what is stated of it, the insect would appear to be a species of the family DUPRESTIDÆ, or the brilliant snapping beetles, many of the larvæ of which mine a flat or shallow burrow in the sap-wood of the trees which they infest, immediately under the bark, which burrow is commonly winding or serpentine, and becomes more broad as the worm increases in size, and at its broadest end has a hole sunk into the solid wood, in which the insect lies during its pupa state. And it is most probable this insect is the Thick-legged Duprestis. Specimens of this beetle, from an orchard in Michigan, were sent to the office of the Country Gentleman last summer, for information as to its name, and I am indebted to Mr. BARRY of Rochester, for pieces of wood containing the larvæ. But my information respecting this insect, the dates when its transformations occur, &c., is by no means complete. I propose, however, to present such an account of it as will enable Mr. Moore to ascertain whether this is the insect which is infesting his orchard. And if it is not, we hope he will not fail of forwarding us specimens of his insect, that will enable us to ascertain what it is. The perfect insect can probably be obtained by selecting a young tree which is fatally wounded by these worms, sawing it off above where the worms are nesting, and drawing a small bag or cap made of gauze, or of the netting used for muskoto bars, over the stump, and tying its mouth below where the worms are reposing. Or, without cutting the tree down, netting may be sewed in the form of a cylinder around the trunk, and its ends tied in such a manner that the insects will be imprisoned within it when they emerge from the wood. And all other worms which are found burrowing in the wood or bark of trees, the reader should know, may be obtained in their perfect state in this same way, except a few kinds which leave the wood and bury themselves in the ground to pass their pupa state.

Those insects which people commonly call snap-bugs, or snapping beetles, from their having the faculty of giving a sudden snap or spring, whereby many of them are able to throw themselves over when laid upon their backs, form two extensive families of the order COLEOPTERA. One of these families, named ELATRIDÆ, (ELATERIDÆ,) are nearly all of dull colors, black, liver brown or chestnut. The other, named BUPRESTIDÆ, are mostly of highly polished metallic colors, many of them being among the most splendid and brilliant of

any insects known. It is to the latter family, as already intimated, that the insect which we are about to describe, belongs.

Next to the common apple tree horcr (*saperda bivitata*), the most common horcr in the trunks of apple trees in our country, is the Thick-legged Duprestis, named *chrysobothris femorata*, by entomologists, from its anterior thighs, which are remarkably thick and swollen as it were, and have a little angular projection or tooth on the middle of their under sides. Hitherto, it is in Ohio and other western states, that complaints of this insect have been made. But, as it is a common species in all parts of our country, it will probably be depredating upon orchards everywhere. It is a native insect of this country, existing here, there is no doubt, long before the apple tree was introduced. Its natural haunt is the white oak, and other species of oaks. And it is probably in consequence of the extensive clearing up of our native forests, that it has been forced to select other trees on which to deposit its eggs, for the purpose of continuing its species. And not only the apple but peach trees are attacked, and young trees are sometimes killed by it.

The perfect insect is a flatish oblong beetle, half an inch in length or somewhat less, with its head sunk deep into its thorax, the thorax being more broad than long and rounded at its sides. It is of a shining black color, and of a firm hard consistence, and on each of its wing-covers the naked eye can discern three raised lines, running lengthwise, the two outer lines being interrupted by two impressed spots, which appear as though they were stamped upon the surface by means of a seal. When the wing-covers are spread apart, the back beneath them is seen to be of a beautiful brilliant green color. The under side and legs are like burnished copper, the feet being deep green.

These beetles make their appearance upon the trees they infest, during the months of June and July, running in the hot sunshine up and down the trunk and branches upon their south side, and dropping their eggs in the crevices of the bark. The worms which hatch from these eggs, feed upon the soft sap-wood immediately under the bark, and probably upon the inner layers of the bark also, forming a shallow wide cavity between the bark and the wood. When they approach maturity they fill the cavity which they have formed, with their castings, and sink themselves deeper in the solid wood, forming not a round but a long narrow hole, and only deep enough for the worm to be contained within it. Many of the insects of this family pass two or three years in their larva state, and it may be the same with this species.

These worms or larvæ, in their form, bear some resemblance to a tadpole or to a battledoor, being quite broad anteriorly, and suddenly narrowed into a long gradually tapering tail consisting of several joints. They have no feet, and are very flat both on their upper and under side, appearing as though the bark had been pressed down and distorted them. They are pale yellowish, with two small black points jutting out in front, which are the jaws. A figure of this larva, and a more full description of the species than what is here presented, with some account of a parasitic worm which destroys it, will be found in my Report on Noxious Insects, published in the last volume of the Transactions of the N. Y. State Agricultural Society.

To enable us to devise the best modes for combatting this or any other insect, it is necessary that we have full information respecting its history and habits. But from the analogy furnished by similar insects with which we are acquainted, we may be able to suggest remedies to which resort can be had, until further investigations shall make known to us others which will be more convenient and effectual.

Wherever, by the discoloration of the bark or any other sign, one of these worms is found to be present, the bark should be cut away until the worm is reached, when it should be destroyed. The wound which is thus made in the bark, will by no means injure the

tree so much as the worm will if it is allowed to remain. But it is probable that before the worms can be discovered by any external appearances, they will have done much injury, especially if several are present in the same tree. Hence it is most important that we should have some resort by which to wholly shield the tree from the attack of these insects. One mode of thus protecting it, will be to impregnate the bark with some substance which will not be injurious to the tree, and which will at the same time repel these insects from it. The parent has the instinct to discover whether her progeny can subsist where she places them, and probably will never deposit her eggs in situations where the young will perish. It appears to be well established that all alkaline substances are poisonous to the larvæ of insects, whilst they also promote the health and vigor of vegetation. By alkaline substances the reader will understand me as referring to different preparations of the "fixed alkalis," potash and soda, and not to the whole class of chemical substances to which the term alkali is extended. We thus have every reason to believe that these beetles will not deposit their eggs upon the bark of a tree which is impregnated with alkaline matter. One of the most convenient and economical substances with which thus to tincture the bark of trees, is the common soft soap, found in all our houses. It probably is not till towards the close of their lives in the month of July that these beetles deposit their eggs. Therefore if about the last of June the bark of apple and peach trees be rubbed with soap, or if this substance be placed in the forks of the larger limbs, from whence it will be washed downwards upon the bark by the rains, these insects I doubt not will discover it, and will forsake every tree which is thus treated. ASA FITCH. Salem, N. Y., June 2d, 1856.

Good and Bad Seed Corn.

There has been a very general complaint this spring that corn has failed in coming up; many fields have had to be planted the second and some the third time. This no doubt has been owing to two causes. First, the unusually wet and cold spring, and secondly, the seed not properly secured, has been generally bad. Last fall was very wet, and corn placed in large bins heated to such a degree as in many instances to destroy its vitality.

The germ of corn is very tender—particularly so—and but little fermentation is necessary to prevent it from coming up. A person in this neighborhood, who selected his seed last fall when he was husking, and braided the husks of the ears and hung them in his crib, had scarcely a single failure in a large field—indeed, he said that he had never known corn to come up more evenly before in his life—although he planted very early. The cause, no doubt, was owing mainly to his seed being properly secured last fall. The damage resulting from corn failing to come up, has been very great—which might no doubt have been in a great measure prevented, by adopting the above mentioned course. E. W. HIRSHDEEN. Macedon, N. Y.

Curing Clover Hay.

The Boston Cultivator recommends the following mode of curing clover:

Cut the clover, if practicable, when free from wet. Leave the swaths unspread for three or four hours. Then, with forks, put the mown clover into cocks which will make each about fifty pounds of dry hay—taking care to lay it up in flakes, and rounding off the tops so as to give the best protection against rain. The process of curing will advance according to the state of the weather. By examination from day to day, a good judge can tell when it is cured, or how much more time it will require. When it is so near dry that it may be finished in one day, if the weather is fair, turn the cocks bottom upward, after the dew is off, and lighten the damp part as much as seems necessary, being careful not to dry it so much that it so much that it will ding.

The Grazier.

Long-wooled Sheep for Mutton.

Messrs. EDITORS—In my former articles in the Country Gentleman, I gave the result of an experiment in regard to the comparative consuming qualities of the New Oxfordshire and Merino sheep; also a cheap and easy method of obtaining a good flock of mutton sheep, by crossing the long or middle woolled on the Merino or common sheep of the country. The success which has attended the introduction of the New Oxford sheep among the farmers in this vicinity, as well as the satisfactory result attending the crossing them with our Merino stock, induce me to give your readers some facts and observations which may prove both profitable and interesting. In giving an account of the habits and qualities of these sheep, I have always endeavored to deal fairly, both with them and the public, preferring to give facts drawn from experience, rather than theories without a foundation on which to base them.

Through the medium of the agricultural press, I hope many of our New England farmers will be persuaded to cultivate a good breed of mutton sheep, feeling confident that it is better business than to depend mainly on the fleece for profit. For three years past I have furnished one of my neighbors with a buck to make a cross on his Merino ewes. The following is the loss and gain attending the first cross. As near as could be judged by the weight and sale of the first clip of wool, the value was diminished twenty cents to the fleece. The average weight of the sheep in the fall, after they were one year old, was 87 lbs., making the whole flock, both ewes and wethers, equal in weight and flesh to his best lot of full-grown Merino wethers, besides a gain of over two dollars a head on the value of the sheep. They are, except in fleece, every way more desirable, and excel, for profit, our best Merinos. The lambs are raised with less care and expense; they are more quiet, better breeders, good nurses, and when raised are such sheep as find a ready sale.

In the fall of 1853 I sold my brother one old ewe weighing 130 lbs., and a small ewe lamb weighing 62 lbs. The next year he received from the flock of John T. Andrew, Esq., West Cornwall, Ct., another ewe which weighed 128 lbs. These two ewes have been fed some kind of grain from the time they dropped their lambs, about the middle of March, until they were turned to grass. With this exception, these sheep both old and young, were kept for two years strictly on hay and grass. At the end of the two years the old ewe weighed 188 lbs.; the lamb now two years and nine months old, 192 lbs., and the second ewe bought, 164 lbs., making a gain of 224 lbs., or what would be equal to 45 pounds on one sheep for a year. The two old sheep in the time raised four lambs, whose average weight at seven months old was 94 lbs., making 376 lbs. The average weight of their fleeces was a little over 7 lbs. We find the loss on this wool in scouring it for the carding machine to be 29 per cent., which deducted from its present weight leaves a fraction over 5 lbs. to the fleece, of well scoured wool.

The income on these sheep, valuing the wool at 30 cents per pound, the gain on the ewes, and the weight of the lambs at 6 cents a pound, a price the butchers paid at that time for extra fat Merino sheep, would be \$46.50, or nine dollars and thirty cents for the keeping of one ewe a single year, and the summer keep of her lamb.

The following notice of a sheep broker's sale, which I find in a Feb. number of the New-York Tribune, shows the value of these sheep when fattened for the market:

"The greatest sale this winter, was made by Richard H. Sherman at Allerton's of three long-wooled sheep for \$22 each. They were fattened by Ab. Burton of Dutchess county, and weighed 200 lbs. each, live weight. These are the right kind of sheep for profit

to the feeder and consumer, though too fat to suit the common taste for lean meat."

It requires no extra effort to bring a good New-Oxfordshire sheep to the weights here mentioned at two and a half or three years old. The lamb I sold my brother, at two years and nine months old, came within eight pounds and the old ewe within twelve pounds of the two hundred, with but very little besides good hay and grass, and within the time raised two lambs which together weighed over two hundred pounds more. Four ewes of this flock, being all that were old enough, have borne seven lambs this season. The largest is now three months old, and weighs 70 pounds.

Since I commenced breeding these sheep, they have lacked but one of bearing three lambs for every two ewes. The average weight of my entire flock of last year's lambs was 82 lbs. on the 17th day of September. At that time I commenced selling. I should judge by the weight of some I sold about the 1st of December, that they would have averaged 90 lbs. if they had been kept until that time. LAWRENCE SMITH. West Worthington, Mass.

Diseases of Animals—Neglected Opportunities.

Messrs. EDITORS—In accordance with the views presented in an article entitled,—*Comments, Inquiries, Suggestions, &c.*,—in your paper of June 12th, we propose to note down, in the briefest form possible, some of the thoughts which occur to us when reading and listening to the communications and conversation of others, and also some of the more note-worthy statements made at club and other meetings of those engaged in the cultivation of the soil. Without any farther preface we commence the experiment we have undertaken, that, namely, of endeavoring to collect some of the more valuable portion of the every-day thinking and talking within our limited sphere of observation, for the consideration and profit of your wide circle of readers. We trust several may follow the example, and pick up and preserve for the benefit of us all whatever may seem worth preserving within the circle of one's own thoughts or of talks with neighbors. In every such circle, however small or barren, an idea, fact or opinion might every now and then be picked up, which would be of value to hundreds or thousands if given to the press to present and preserve for public use.

We were considerably interested in the communication of Dr. CUMING, in your paper of June 12th, and were much pleased when we read your request that he should become a more frequent contributor to the veterinary department of your paper. As Dr. C.'s remarks give evidence of his possessing the two most important qualifications for a physician, whether his patients are of the human or the brute species, namely, a large amount of professional information and great soundness of judgment, we trust your readers will not unfrequently have an opportunity of improving themselves in the proper treatment of their animals by his practical suggestions. Let any one try to reckon up the number of deaths among animals of all kinds, within a circle of a few miles around his residence, and within a few years, and also the number of animals who have suffered or been sick, but not unto death, and he will be convinced that if those who own and have the care of the various domestic animals, had more knowledge of the right mode of managing, so as to prevent disease as well as to cure it, there might be a great deal less loss of life and property, and a great deal less suffering among the useful animals which Providence has made dependant upon us for comfort and proper care. Perhaps there could be no better way of securing an increase of this useful kind of knowledge, than to present actual cases of disease, both present and past, and to solicit information as to the proper mode of management should the ailment continue, or should it ever again occur. If those who have lost valuable animals, or have at any time sickness or lameness among their stock, would describe the symptoms of the case, they might receive the benefit of the skill of Dr. C., or of

some one else who has made the diseases of domestic animals their particular study, so as to be better prepared for the present or any future ailment among their creatures.

We have often been surprised that so many neglect opportunities within their reach, of adding to their supplies of fertilizing materials. Many allow suds and slops, poultry-house droppings, and many other manurial matters to go to waste. But we have in view, at present, mainly, those who neglect to secure a load every now and then of leached ash, spent tan, sawdust, &c., when passing piles of these with an empty wagon. About every village almost, these things could be had gratuitously, and yet hundreds return from the village with their wagons empty, who might add considerably to the productiveness of their fields by a few minutes' labor in loading them with some of these easily-to-be-had articles. E. D.

To Divest Calves of Vermin.

It often happens that calves become covered with vermin, causing them to lose flesh and look very dull. To clean the calf is a very disagreeable piece of work; but if the following recipe is adhered to, they will become clean with a very little trouble. Give the calf a tablespoonful of brimstone three mornings in succession; if one trial does not completely rid the calf, the second will never fail. I have tried it several times, and once has been enough in each instance.

The Florist.

The Sensitive Plant.—(*Acacia Mimosa*)

In its native country, (Brazil,) this singular plant grows to the height of seven or eight feet, and is armed with short recurved thorns; the leaves grow upon long footstalks, which are prickly, each sustaining two pair of wings; from the place where these are inserted, come out small branches, having three or four globular heads of pale purplish flowers, coming out from the side on short peduncles. "Naturalists," says Dr. Darwin, "have not explained the immediate causes of the collapsing of the sensitive plant; the leaves meet and close in the night, during the sleep of the plant, or when exposed to too much cold in the day time, in the same manner as when they are affected by external violence, folding their upper surfaces together, and in part over each other, like scales or tiles, so as to expose as little of the upper surface as may be to the air; [many of the acacias do this which are not otherwise sensitive;] but do not, indeed, collapse quite so far, for when touched in the night, during their sleep, they fall still farther; especially when touched on the footstalks between the stem and the leaflets, which seem to be their most sensitive or irritable part. Now as their situation, after being exposed to external violence, resembles their sleep, but with a greater degree of collapse, may it not be owing to a numbness or paralysis consequent on too violent irritation, like the faintings of animals from pain or fatigue? A sensitive plant being kept in a dark room till some hours after day-break, its leaves and leaf-stalks were collapsed as in its most profound sleep, and on exposing it to the light above twenty minutes passed before the plant was thoroughly awake and had expanded itself. During the night the upper surfaces of the leaves are oppressed; this would seem to show that the office of this surface of the leaf was to expose the fluids of the plant to the light, as well as to the air." If kept in the dark it fails to expand during the entire day. Although easily grown by every one, simply requiring to be treated as a tender annual, there is no plant we grow requiring so little trouble, that excites such a lively interest, and been seen by so few people, as this sensitive plant. Dr. Darwin thus characterises this plant in verse:

"Weak with nice sense, the chaste *Mimosa*" stands,
From each rude touch withdraws her timid hands;
Oft as light clouds o'erpass the summer glade,
Alarm'd, she trembles at the moving shade;
And feels alive through all her tender form,
The whisper'd murmurs of the gathering storm
Shouts her sweet eye-lids to approaching night,
And hails with freshen'd charms the rising light."

* Formerly called *Mimosa*.

THE CULTIVATOR.

THIRD

To Improve the Soil and the Mind.

SERIES

VOL. V.

ALBANY, MAY, 1857.

No. V.

Theory of the Management and Application of Barn-Yard Manure.

Which is best, fresh or fermented manure? Neither is best always, and each is best sometimes.

Perfectly fresh manure is probably not a fertilizer for our cultivated plants. Doubtless it cannot be absorbed and appropriated to any great extent by the higher kinds of vegetation, until it has undergone those changes which are comprehended under the terms fermentation, putrefaction and decay. All evidence points out the products of these changes to be the actual food of plants. We are quite warranted in assuming that stable or yard manure must ferment or decay before it can exert much beneficial action on a growing crop. It does not necessarily follow, however, that the manure must be fermented in the usual sense, i. e., rotted, above ground, before it is given to the soil. Manure may often decay in the soil itself, so rapidly as to become immediately useful to crops, though applied in a fresh or nearly fresh state.

It may also remain for a time uncomposed and innutritive to the plant. This will depend chiefly upon the character of the soil,—will be affected also by weather, and by the nature of the manure. In order to enable us to decide what will happen to fresh manure if buried in the soil, we must in the first place know what are the conditions of decomposition. These are, 1st, *moisture*, not wetness nor dryness—2d, *warmth*—3d, access of atmospheric air, or of the oxygen of the air. Furthermore, other things being equal, the decomposition of manure is more rapid as it contains more nitrogenous matter. Horse-dung ferments quicker than cow-dung; it is richer in nitrogen. On the other hand, the more coarse litter that is mixed with dung, the slower will the whole ferment; while the porosity or division of it, which increases its contact with air, must facilitate decomposition. The last mentioned circumstances, it will be seen, are to a degree antagonistic, and compensate each other.

If our premises thus far, are correct, it is obvious that in soils which are warm, porous, and neither too wet nor too dry, manure will decompose readily, so that it may be furrowed under to a certain depth, in the fresh state, and yet produce its maximum effect upon the soil. It is also plain that manure, especially

if mixed with much coarse long litter, may be protected more or less from decomposition, when buried in a wet or heavy soil, and may therefore fail to manifest a decided action, or so decided an action as an equivalent of previously fermented manure.

From the above, we are not by any means warranted in assuming that fresh manure is best on all light warm soils, and fermented manure on all clayey or heavy soils. There are substances which exert a specific action on decomposing organic matters; some facilitate, others hinder their decomposition. Lime is generally supposed to belong to the former class, and gypsum is known to be one of the latter kind of bodies. It is not improbable that oxyd of iron and alumina when existing as such in the soil, may check decomposition; probably too, the humus of the soil, when of the acid sort, as when formed in presence of much water, may hinder decomposition. But of the precise effect of the various ingredients of the soil we possess no minute knowledge. These suggestions are made merely to show that probably there are many causes that may modify the process of decomposition, and consequently the apparent value of manure.

The depth to which the manure is buried is of the greatest influence. A case has just come to my knowledge, of a garden into which stable manure was deeply trenched by a former owner several years since; the present proprietor has recently found the buried manure just advanced to a medium state of decomposition. If manure be covered shallow in a light soil, especially if it be imperfectly covered, in dry weather it may become too dry to be of service to the vegetation. When managed as Mr. CLARK describes, (*Co. Gent.*, No. 8, p. 122, 1857,) the results are found to be good. He turns the *moist* and solid manure under a *sod*. Decay goes on with sufficient rapidity—the manure cannot dry up. Will Mr. CLARK have the goodness to inform us how deeply he covers the manure—whether he turns the sod flat or leaves it inclined—and what are the characters of his soil and sub-soil,—especially how porous and how retentive of moisture and of water they are?

Mr. JOHNSTON of Geneva, and Mr. NORTON of Farmington, Ct., if we mistake not, experience least immediate benefit from manure plowed in when fresh. Is

this due to the fact that their soils are clayey, and thus oppose the rapid decomposition of manure?

Thus far we have considered the manure merely as direct food to the plant, but the question is by no means so simple. The texture, and what besides is included under the term "physical characters" of the soil, are often much changed by a large application of coarse yard-manure. It may happen that a heavy soil will derive more benefit from the loosening effect of incorporating with it a large amount of vegetable matter, than from the rapid nourishing action of fermented manure. Nay, it may be that the latter action cannot exhibit itself until in some way the texture of the soil has been improved. On light soils, which suffer from too ready drying up of the surface, the application of coarse manure may well assist to rectify this fault, as the power of the humus which would accumulate in the soil by this treatment, to retain moisture, is, according to Schubler, seven times greater than that of sand, and three to four times greater than that possessed by medium loams.

The advantages of fermenting manure are chiefly, 1st, Lessening its bulk and weight, whereby the expense of transportation is diminished by one-third or one half—2d, Converting the crude matters into soluble and available forms of nutriment to the plant, thus quickening the action of the manure—3d, Convenience of incorporation with the soil, the coarse, long litter being broken up and made fine. Rotted manure is best on soils or crops which demand a quick fertilizer, and under circumstances where an immediate rather than permanent benefit is desired, and would seem especially advantageous on soils so rich that they only need a little active manure to produce good crops. On the whole it is chiefly a question of time. Long manure acts slower on any given soil than fermented manure; but its effect is correspondingly more durable. The matter of time is, however, one of the greatest importance. We want the manure available at just those periods when the plant may derive the greatest advantage from it, and we want it to become available just as fast as the rapidly-growing plant requires.

Thus far we have not raised the question—Does fresh manure suffer loss by fermentation? We have assumed that the manurial value of both is not materially different in amount but only in activity. We have sought to account for the differences of opinion and experience with reference to the use of fresh or rotted manure, by differences of soil, &c.

With this, as with many of the great topics of Agriculture, there are two sides to the question, and when we approach it from opposite points, we may well take a lesson from the story of the Knights, who met where a shield was placed in the highway, and as they halted to admire its costly workmanship, one cried out, "Who raised this silver shield?" to which the other rejoined, "Sir Knight, are you blind to say this is silver? By my good sword, it's the purest gold!" A violent dispute arose, and shortly the warriors slew at each other with such fury that they both were wounded and unhorsed. A good Samaritan who came that way, staunched their wounds and revived them, and then inquired the cause of their dispute. They began to renew the battle of words, but he bade them hold their peace, which they did, and were ashamed as he said, "The shield is silver on one side and gold on the other."

What loss there may be in fermenting manure, will be the subject of a future paper. S. W. J. Yale Laboratory, New-Haven, Ct.

ENTOMOLOGY.

No. XIV.—Insects Imbedded in the Interior of Wood.

Mr. N. of Shrewsbury, Vt., in a letter written on the 25th of last March, encloses three specimens of "something" of which he says he had that day found 15 or 20 specimens. He wishes to know their "name, habits, and whether they are injurious to agriculturists or horticulturists." Mr. N. ought to have stated, what we doubt not was the fact, that in splitting some fire-wood at his door, he came upon these insects imbedded in the interior of the wood, without any visible orifice by which they could either enter or crawl out of the cells in which they were lying, in a torpid state. He ought also to have informed us that in some places this wood was decaying, and contained a number of large white grubs which had perforated it in holes the size of pipe-stems, which holes were stuffed full of a powder of the same color with the wood; and he ought also to have told us the kind of wood in which he found them. All these are important facts, which we presume were well known to Mr. N. when he wrote this letter. Why he is wholly silent with respect to them, and asks us to "publish" what the habits of this insect are, and whether it is injurious to field crops or gardens, when he himself knows that it is to forest trees that it is injurious, we cannot divine. It certainly looks as though he was covertly aiming to draw from us an account of this insect, which he can show to be incorrect. But we do not wish to judge him thus harshly, and are therefore willing to suppose, that, being surprised to meet with these insects in such an unusual situation, he simply wishes to ascertain whether any body else has ever seen the same phenomenon, and therefore avoids giving any clue to the circumstances under which he met with these specimens. However commendable his caution may be, in not proclaiming that he has discovered "a unique specimen of a very curious character, unlike any thing ever before seen in the world," until he has ascertained whether it really is such a rarity, he still should have told us, frankly and candidly, what he knows in the premises, before asking us to give him what we know. Our object in writing these articles is to add to our own knowledge, as well as that of our readers. With the extended circulation which the Country Gentleman enjoys, we hope by this series of communications to induce its readers to notice the habits of every interesting insect, and especially every injurious one, which makes its appearance in any part of our country, and send us an account of it accompanied with specimens whereby we will be able to ascertain its name and describe it, so that such insect and its habits will be definitely known through all coming time. From the information thus communicated to us we have already been able to place on record the Hunter weevil, the wheat Thrips, the Prickly Leptostylus, and other insects, whose history was before unknown. And by continuing this course we hope to gradually obtain an acquaintance with all the more important insects of our country. We trust that no new and unknown depredator of this class will be permitted to make its appearance in any district or neighborhood without an account of it being communicated to us.

The insect to which allusion has been made above, is the Pigeon Tremex (*Tremex Columba*), which name appears to have been bestowed upon it by Linnaeus merely from fancy, as other species related to this have been also named the sparrow, the bat, the camel, &c., although they are in no respect analogous to these animals. They pertain to the Family UROCEIDÆ of the Order HYMENOPTERA. This insect has some resemblance to a large wasp, but its abdomen is closely joined to the thorax, without any such interval between as

THE COUNTRY GENTLEMAN.—And here I wish to say for your encouragement, and for the benefit of those who want a sound agricultural paper, that in my opinion the "Country Gentleman" is at the head of the list, and that its sound practical teachings, if read, cannot fail to produce a salutary influence upon the agricultural interests of our country. L. A. B.

occurs in the wasp. It is cylindrical and as thick as an ordinary sized lead pencil, and about an inch and a quarter long, of a black color more or less varied with brownish yellow in different individuals, the wings being smoky blackish and shining. In the female, the abdomen has six light yellow bands, the forward one of which is much the broadest, and all the others are interrupted on the middle of the back. Her ovipositor is formed of very coarse horny bristles which arise from the middle of the under side of the abdomen and project backwards like a tail, reaching a quarter of an inch beyond its tip. With this apparatus she is able to bore deep into solid wood to deposit her eggs. The grubs which hatch from these eggs are white, fleshy, footless cylindrical worms, with a deeply impressed line or furrow on each side beneath, extending their whole length; and the hind end is furnished with a small sharp-pointed black horn or hook which curves downwards. By these marks they may readily be distinguished from other borers in timber. They grow to more than an inch in length, and to the thickness of a lead pencil. They feed upon the wood, gnawing long slightly curved holes. They are placed so deep in the wood, that they cannot thrust their castings out of their burrows, as many other borers do. Hence their burrows are filled and densely packed with this dry powder, and externally there are no indications by which to know that these worms are present in a tree, unless the holes happen to be discovered out of which those which have completed their transformations have crawled.

Dr. Harris states that he has found these insects in pear trees, in elm, and in button-wood. I have found them in maples much oftener than in any other tree, and have also met with them in beech; and in Illinois a female was captured depositing her eggs in the burr oak. It is therefore probable that they infest all our forest trees, except perhaps those of the pine and spruce family. The wood in which we meet with these insects is always in a decaying state, and some persons have hence supposed that it is only trees which are old and beginning to decay, to which they resort. But I have taken the female depositing her eggs in thrifty young maples and oaks. It is therefore evident that they attack timber which is perfectly sound, speedily reducing it no doubt to a decaying state. When they once make a lodgment in a tree they continue to infest it more and more, until it is dead and so much decayed that they are obliged to abandon it and repair to other trees. At the moment of my copying for the press this line, a person informs me he lately met with what I presume was one of these insects, in a maple log, its cell being just large enough for it to be crowded into it, and there being not the least indication of any passage or track by which it had come to this spot. The log was split up by him for fire-wood, and was perfectly sound in every part, and no other insect or worm was found in it. As the eggs of these insects are sunk so deep in the wood, and the larvæ work into it still deeper, it seems out of our power to administer any relief to a tree which becomes infested. Its gradual decay and death probably cannot be averted. Whether it is possible to impregnate the sap and wood of the tree with any alkaline, mercurial or other substance which will destroy these insects without injuring the tree, the present state of our knowledge does not enable us to say. The best thing we can do, is, to make ourselves acquainted with the female Tremex, and whenever one of them is found around the trunk of a tree, or in any other situation, capture and destroy her. Where these insects are found to have made a lodgment in a valuable tree, it may perhaps be possible to arrest their career by winding the trunk and larger limbs with straw or matting, to such a thickness that the female will be unable to reach through it with her ovipositor to place her eggs in the wood. Those grubs which are already lodged in the tree, on completing their transformations, will probably cut their way out through such covering, but will be obliged to select some new situation for their progeny. The knowledge of this insect which we at present pos-

sess, is too imperfect to enable us to give anything more than more suggestions with regard to remedial measures.

The reader is aware that the wood borers generally, like most other injurious insects, are destroyed and their undue multiplication prevented by other insects which prey upon them. But we should expect that the Pigeon Tremex, lying as it does deep in the solid wood, would be quite beyond the reach of any parasitic or predaceous enemy of this kind. And yet, if it were so, and this species were allowed to increase and extend itself unchecked, such numbers would soon be generated that it is probable all the trees in our forests would become infested and destroyed by them. And we accordingly find that He who created this insect and gave it the interior of the solid wood for its abode, knew how to create another insect furnished with a suitable apparatus for piercing deep into the wood, to reach and destroy this one. The mode in which this parasite of the Tremex works its long tail-like ovipositor into the wood is very curious and has never yet been accurately described. To give an intelligible account of this insect, and its singular organs and the mode in which it uses them, would extend this article to an undue length, and we will therefore be obliged to devote a future number to this subject. ASA FITCH.

Kiln for Drying Fruit.

EDITORS COUNTRY GENT.—I noticed in your paper of Feb. 19th, an inquiry for a kiln for drying fruit, and in reply will describe one I have. In the summer of 1855 I was building a smoke-house, 5 by 6—the foundation of brick three feet above the ground for the purpose of depositing ashes—the top of wood, extending six feet above the brick work, with an arch on one side of the brick work three feet long, two wide, in which to make the smoke. While erecting I inquired of my mason if he knew of any good plan for a kiln dry? He replied that he did not, but suggested that I could soon convert my smoke-house into a good one by putting a stove into the arch; and upon his suggestion, when finishing my building I made three doors in front, and put in strips of board 10 inches apart, on which to slide the drawers—putting in the middle one temporarily, to be removed when used for smoking. Had three tiers of draws, six in a tier, making eighteen in all.

I put a box stove in the arch, conducted the pipe around horizontally, then up to the chimney, leaving an aperture through the wall into the building some six inches in diameter larger than the pipe, so that the heat from the stove would naturally pass into the room. I also had sliding doors in the gable, so that the circulation would be brisk when the kiln was first filled, which doors could be closed when the fruit began to dry and the escape of moisture become less.

My drawers I made of strips of boards as follows—18 inches wide—4½ feet long—4 inches deep—cut gains with a saw deep enough to receive a stout twine, half an inch apart—put on the warp first, and then wore in the filling with a long wire, nailing on a strip of lath over the twine to prevent wear, and to keep it in its place.

When apples became fit to dry, we prepared them by cutting the quarters once or twice in two, according to the size of the apple—(care must be taken to have the pieces as near of a size as possible)—and filled our new kiln-dry, and were well pleased with the result. We found we could put in seven bushels at once very nicely, and requiring from 24 to 36 hours of time to cure. When they came out they were white and crisp, and by lying in a pile a few days they would absorb moisture enough to pack nice, and when packed will keep without any fear of being eaten up by worms, if not consumed the same season.

Apples thus dried are far superior to those dried in

the primitive way, either of stringing and hanging around the kitchen stove as a roost for flies, or spread out and dried in the sun, where they are often injured if not spoiled by storms. As mine is only used in a small way for drying for the family, and what few surplus apples that are not fit for market, I would recommend any one going into the business and drying for market, to build on a larger scale and have more drawers, as I think mine are about the right size to be easily handled. I took the stove out and used the building for smoking a year ago, and not having apples to dry last fall, cannot tell whether the smoke will have any injurious effect on the fruit or not. My impression is that thorough ventilation before using for drying fruit will expel all the odor of the smoke—if it should not, I think white-washing will. H. DABOLL.
Canal, Onondaga Co., N. Y.

Application of Barn-Yard Manure.

Of late there has been much discussion in the columns of the Co. Gent. on the application of manures to the soil, preparatory to planting it with corn. This has been occasioned by Mr. JOHN JOHNSTON's statements of his management and application of manures to his land for the corn crop. For the benefit of new subscribers, who have not seen Mr. J.'s first letter, we give a synopsis of his system. Mr. J. annually sows from 50 to 70 acres of wheat, and also has many acres in oats, corn, &c. He winters from five to six hundred sheep, and 15 to 20 head of cattle. To use up this large amount of straw and corn-fodder, it is daily, through the winter, freely strewn over his yards; what is not eaten is trodden and mixed with the droppings of the stock. Of course during winter the straw does not ferment or decompose. Generally, all this long manure is put in large heaps in the spring, where it remains till sowing of winter wheat, for which a portion of the now rotted manure is used. That portion of the manure intended for the next year's corn crop, is in September carted on to grass-land, and evenly spread over it, where it lies till the next April or May, when the land is plowed for corn. His method is objected to on the ground that there must be much loss of ammonia and other gases from the decomposition of the straw and manure during summer, and also from that portion upon the greensward. But as Mr. J. "believes the great scare-crow, the escape of ammonia by fermentation, is all gammon," he does not feel disturbed about that matter.

To show that Mr. J. is not entirely alone in his views, we copy a short article from *Littell's Living Age* of Nov. 15, 1856. It says:

"In a paper on farm-yard manure, by Dr. Voecleer, Prof. of Chemistry, Royal Ag. College, at Cirencester, we find statements that will be a surprise to some farmers. For example: the liquid drainage of dung-heaps, he says, is more valuable than the urine of animals, because it contains phosphate of lime, which is scarcely to be found in the other. That no loss arises from spreading manure on the surface of a field; on the contrary, the fermentation is stopped, and the escape of volatile matters thereby ceases; and if it be left to lie till the rain has washed it in, is far more beneficial than burying it at once. And 'in the case of clay soils,' he remarks, 'I have no hesitation to say the manure may be spread even six months before it is plowed in, without losing any appreciable quantity of manuring matters.'"

From the foregoing it will be seen that Farmer J. and Prof. V. are "hand in glove" with each other. One is a practical farmer, the other is a scientific one. The practice of one, and the teaching of the other, is the very antipodes of the practice of myriads of good farmers and the teachings of other scientific professors.

Well may we hard-working farmers exclaim, "What is truth?" L. B.

How to Use Hen Manure.

Messrs. TUCKER & SON.—In your Co. Gent. of the 5th Feb., I see the request for the experience of some one using hen manure. I have, for several years, kept a large quantity of hens for the profit, (as I consider the profit of one hen to exceed that of one sheep,) and have carefully saved the manure, which I put into barrels, and mix it well with ground plaster as I gather it, enough to dry it and to keep it from losing its goodness; then keep it dry till planting time. I then take an empty barrel or tub, and mix the hen manure and plaster with more plaster, so that it will be about two parts plaster and one hen manure, and with a sharp spade chop into the mixture, which will very readily pulverize by a little chopping and spading over, and it is then ready for the hill of corn or potatoes. If I have any left after planting, I use it at hoeing, and find that my corn so treated is not troubled with any worms, and that the crop is equal to that grown where I spread my barn-yard manure. I think farmers can safely pay fifty cents per bushel for hen manure, if it has not been laid on the ground. It pays to have boxes under all the hen roosts. There are many farmers that will give away the hen manure to the tanners, but if they will but one year try the above method of using it, they will be perfectly pleased with the result. D. A. BULKLEY. *Stone Hill Farm, So. Williamstown, Mass.*

About Strawberries.

Messrs. EDITORS.—I will not attempt to give the reason why those strawberries failed; but if you please I will will give two items of my own experience, and Mr. McCARTHY can judge for himself whether our failures arose from like causes. Some years ago, (before I "took the papers") I set a bed of strawberries with plants from a field of two acres which were in full bearing. They were set in August, and were full of flowers the next spring, but at picking time they were not full of fruit. I supposed that was owing to their not being fully established, but in the course of the year I read "Downing's Fruit Book," and the next spring at flowering time I examined them "by the light of science," and found that nineteen-twentieths of them were staminate plants. I suppose the reason of this was that the stamens are stronger growers than the pistils, and one of course always selects the strongest plants. I have since set another "patch," with plants from three different beds, and there proved to be not a stamen among them. Of course the flowers, like Mr. McCarthy's, dried up without fruit.

I have a bed now, however, to the sex of every individual plant of which I can make oath if necessary, and I shall never set another bed without being certain of my kinds. So many are disappointed from the above causes, that I think some of the hermaphrodite varieties, (Peabody's new or Hooker's perhaps,) are better for general cultivation. This, however, is theory. EDWIN Y. BULL. *Meriden, Ct.*

Cure for Horn Ail.

EDS. CO. GENT.—I have a cure for the horn-ail, that I do not recollect of ever seeing in your paper. It is very simple, but I have known it to cure when nothing else that could be thought of would. Take a piece of alum as large as a walnut, pulverize it and put it into about a wine-glass full of sharp vinegar—turn up the head, and pour it into one ear. In two or three days pour the same quantity in the other ear. A third application is seldom necessary. A. ALLEN, JR. *Littleton, N. H.*

The Country Gentleman.

A Journal for the Farm,

the Garden and the Fireside.

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A GENERAL VIEW—CHICAGO, ITS GROWTH AND PROSPECTS—RAILROAD FACILITIES—THE ILLINOIS CENTRAL COMPANY—THE STATE AND THE FAR WEST MADE TRIBUTARY.

To realize the force of the line,

"Westward the star of the empire takes its way," as settlers to our country, one must do something more than roll over "the great west" in the rail-cars. Observation in this way however extensive, is confined to a very narrow space, and that generally of the least productive and most forbidding character; and the information to be gathered in casual conversation with fellow-travellers and at the stopping places in the principal towns, is of altogether too meagre and unreliable a kind, to enable one to form any correct opinion of the agricultural capacities of Prairie Land. In spending some time at several of the chief towns, or cities as they are there uniformly called, in Illinois and Wisconsin, I had good opportunities of learning the prices of "city lots," and the perfect wildness with which the fever of speculation rages in many of them. And had I gone no further I should have returned to the East, like many others, in the full conviction that western people were verging on insanity upon the subject of "corner lots" and the value of mother earth by the "square foot,"—as indeed they really seem to be in some places—Chicago and Milwaukee for instance. It is well known that in the former, land two or three miles out of town, itself little better than a swamp, with no streets or improvements—except those on the maps, is held at higher prices than in the upper part of the city of New-York. So in Milwaukee, although rates for out-lots by no means compare with those at Chicago, yet one might suppose from the sum asked for 24 feet by 120, that land was one of the very scarcest things to be found in that vicinity.

Well informed as I was in relation to the growth and rapid extension of Chicago, as well as in regard to its commercial statistics, I must nevertheless confess to great surprise at the high prices to which real estate has been forced by the mania for speculation so prevalent for some time past. The extreme point must now have been nearly reached; and, although prices may not exceed what at some future period will become actual values, many of the vast "fortunes" supposed to have been accumulated during their present advancement, must pass away like the shadows of the morning before that day arrives. The market for speculation ere long will cease, and the demand will then be limited to the acres successively needed for purposes of improvement—to supply the requirements of the growing commerce and population of the city. The necessities of speculators can but compel them, so soon as this change shall occur, to sacrifices that will inevitably reduce, for a time at least, the valuation of most, if not all that large territory lying away from compact business localities, and now bartered and doled at figures on which its owners are considered millionaires.

But, on the other hand, the prospects of Chicago—although she may experience times of depression and re-action,—from her position as the entre-pot and outlet of the incalculable riches developing with such wonderful rapidity in the vast tributary regions of the prairies, can hardly fail to justify even the highest ex-

pectations, nor should we be surprised to see her rank at no very distant time, as the SECOND CITY OF THE REPUBLIC. To say that she is already the largest grain exporting mart of the world, is only to mention the beginning of that immense trade which must result from the further and better cultivation of the lands of Illinois and the far west. As yet, but the first steps as it were, have been taken in opening up this almost boundless extent of fertile soil to a productive population, the fruits of whose agricultural and mechanical labor is all of it to find a market and outlet, and whose vast consumption is in turn to be supplied through the warehouses, by the vessels, and over the railroads of Chicago.

The ease and cheapness with which the prairies are brought under cultivation, and the facilities both for marketing their products and procuring supplies for the new settler, over the perfect network of rails with which the State is laid, are such as to render the prospective increase in the yield of Indian corn and other grain, and in the "manufacture" of beef and pork, almost inconceivable both in extent and rapidity, except to those who have been careful witnesses of the progress made during the past ten or twelve years. Could actual settlers have obtained the lands at government prices, there can be little doubt that the population and wealth of Illinois, would now have been nearly or quite double what they are. The credit given by owners, and the comparatively moderate prices at which many are willing to sell—from \$5 to \$15 per acre—nevertheless offer sufficient inducements to those who prefer to pay for railroad privileges rather than go beyond them to buy cheaper, and are leading to a wonderfully rapid filling up of the unbroken lands both of this State and of Wisconsin. The immense advertising on the part of the Illinois Central R. R. Company, and the favorable terms on which its territory is offered, have manifested a far-seeing sagacity and a spirit of enterprise unusual in a corporation, and have been more effective in attracting public attention to the whole State, than perhaps any other single cause that has operated towards its present prosperity. Not only has this company availed itself of the circulation of nearly every paper of repute, by liberal advertisements, but its handbills in diverse languages have been sown broadcast wherever a railroad could carry them, with an energy and profuseness, now yielding a harvest, both to the stockholders and the State, almost inestimable in extent.

It is not only in Illinois that every acre brought under the plow must aid in swelling the revenue of Chicago merchants and shippers, but the long trains of emigrants constantly pressing on for the still unsold government lands of Iowa and Minnesota, will all of them in a greater or less degree contribute to its enlargement and join in multiplying its business and riches. It must be their head market and chief depot of supplies, and every inch of railroad graded, and every furrow of new earth opened in these States, must add their production and traffic to the increasing streams that now center here. With all this to look forward to, it is difficult to condemn the extravagant expectations in which so many have indulged, and if we are to expect a revulsion, it is one which can only in the end

establish upon a firmer basis the true progress and growth of the city. It will have much to conquer in the natural infelicities of its location. The expenses of filling it up to a grade that will admit of drainage, must bear heavily upon property at present unproductive, the owners of which will find themselves heavily taxed for its improvement, and it must be something of a burden even in the streets now most closely and handsomely built.

How Much Clover Seed will you Require next Spring.

Now—yes, now—is the time at which this question can be determined to the greatest advantage by those who propose to raise their own supply of seed. If a farmer has any clover growing on his own land, as all who manage well do have every year, then he can scarcely ever do better with at least a part of the land in this crop, than to raise his own supply of seed for the coming season from it. There may be, doubtless, exceptions to this general rule, as there are to almost every rule of the kind.

Taking it for granted, then, that every farmer does, or at least should, sow clover every spring on all land with wheat and barley crops—(it may be risked also with oats sometimes, though there is a considerable risk of failure)—and that it is better on several accounts to raise his own seed than to buy, a good manager will determine quite early in the season *how much* he will be likely to want, and *how* his supply of seed for the succeeding spring is to be provided. Let us take the case of one on a farm of medium size, say of eighty acres. Such a one will, probably, have fifty or sixty acres under cultivation, and will put about a fourth part of the whole into wheat each year. Taking one year with another, he will require clover seed enough for twelve or fifteen acres, and as from three to four bushels of seed per acre may be reckoned upon as an average crop, and as it is better to sow as much as fifteen pounds of seed on an acre than any less, it is obvious that between one and two acres must be devoted to the raising of the seed that will be needed for the spring seeding of fifteen acres.

The patch of an acre or two which is devoted to raising the supply of seed for the next spring, should be treated somewhat better, and somewhat differently from the rest of the land in clover, in order to secure *first-rate* seed. We need not insist upon the importance of having clover seed, and all other seeds, as fully matured and as nearly perfect as possible. We assume that this matter is well known, and farther that it is also known that frost checks the growth of this seed, and that full, plump, and perfect seeds cannot reasonably be expected in the second growth of the season, if the first one was very luxuriant or cut rather late in the season. To avoid these sources of injury to the seed, the patch devoted to raising it should have the first growth of the season cut quite early, or be pastured until about the last of May or first of June, so that the second crop may have full opportunity for the perfect elaboration and maturing of the seed, before that essential process is arrested by early frosts. To contribute still farther to having the seed as well filled and as perfect as possible, the patch devoted to this purpose should have a top-dressing of liquid manure or guano, or well-rotted barn-yard manure, as soon as the first growth is removed. The land may be in good heart enough to perfect the seed without any such assistance, but so important is it to have the seeds plump and well matured, that some of the best farmers make it a general practice to give the patch on which they propose to raise seed for their own use, a top-dressing with some kind of manurial matter. The kind of manure to be applied will be determined by various circumstances, nothing, however, being better (when a large garden watering engine, or an old hoghead fitted up on a cart or wagon, with a perforated tube, can be had,) than two or three applications of liquid manure from a tank, or made otherwise, immediately af-

ter removing the first crop. Droughts are not uncommon at this time of the year, and the roots left open and exposed to a scorching sun, do not readily put forth any new foliage or commence the second growth. In such a state of things, a top-dressing of well-rotted manure will partially mulch the land, as well as enrich it, if the manurial matter could only be washed out of it into the land by either a natural or artificial watering.

The object of all such applications is to secure an early start for the second growth which is to yield the seed, and to furnish the plants with the elements necessary for the elaboration of the seed in the most perfect form. Plaster, it is now pretty generally admitted, does not favor the early maturing, nor the plumpness or perfectness of the seed. It is supposed to favor the growth of the foliage at the expense of the seed and of its early ripening.

Those who require only a few bushels of seed will do as well to sow it in the chaff as to have all the dusty and dirty job of threshing and cleaning their seed, and the expense of a machine besides. Those requiring larger quantities will generally prefer to have it threshed and cleaned by a machine.

Chemical Composition of Wheat Flour.

AMOUNT OF NUTRITIOUS ELEMENTS IN BOLTED AND UNBOLTED FLOUR, COMPARATIVELY.

A series of experiments has been made by Mr. J. B. LAWES and Dr. J. H. GILBERT, for the object of determining the comparative amount of nitrogen, phosphoric acid, &c., in flour of different degrees of fineness, or, in other words, in superfine flour, fine flour, and that which contained more or less branny matter. From the results of these experiments published in the Quarterly Journal of the Chemical Society, (London,) for April last, it appears that the per centage of nitrogen was about once and a half as great in the bran as in the finer flours. Even after including all the coarser portions of flour which are usually considered fit for bread-making, still the excluded branny parts contained considerably higher per centages of nitrogen.

Turning to the *ashes* of the respective products of ground wheat, there was found to be a much larger proportion of matter insoluble in acid in those of the finer flours than in those of the coarser brans. On the other hand, there was considerably the highest per centage of *phosphoric acid* in the ash of the brans. The magnesia was also the higher in the ash of the brans; and the potash and lime the higher in that of the flours. The proportion in which the more important constituents of wheat are contained severally in the usually edible flours, and in the branny matter, was found to be, on an average, about as follows:—In the flours commonly considered fit for bread, nearly three-fourths of the total, nitrogen; about one-third or two-fifths of the total, mineral matter, and only about one-third of the total, phosphoric acid. Notwithstanding the higher per centage of nitrogen, and the large actual amounts of the mineral constituents of the grain contained in the branny portions, the writers of the paper were of opinion that such were the effects of the branny particles in increasing the peristaltic movements of the bowels, and thus clearing the alimentary canal more rapidly of its contents, that it was questionable whether in the generality of cases, more nutriment would not be lost to the system by the admission into the food of the imperfectly divided branny particles, than would be gained by the introduction into the body in connexion with these irritating or cathartic particles, of a larger amount of supposed nutritious matters. The action alluded to, that is, the well-known effects of unbolted flour in increasing the frequency of the movements of the bowels, may indeed be conducive to health with those of a sluggish habit, the sedentary, or the over-fed; but with those who do not come under either of these descriptions or classes, the benefits derivable from the use of unbolted or Graham flour, especially in those whose diet is in other respects innu-

tritious or scanty, may be more than counter-balanced by its tendency to irritate or quicken the movements of the bowels.

From another set of experiments, it appears that the average yield of bread, with flours of varying fineness, was rather more than 135 for every 100 of flour. The average of nineteen experiments with fine flour, composed of the products of the first three wires mixed together, gave a produce of about 137½ of bread for every 100 of flour. Of 100 parts of bread, about 63 were dry substance, and 37 water. Bakers' loaves procured in the country, gave an average of 62 per cent. of dry substance and 38 of water, while loaves procured in London gave rather more than 64 of dry matter and 36 of water, within twelve hours of its being withdrawn from the oven.

ENTOMOLOGY.

No. 15.—Grasshoppers.

SCOTT COUNTY, MINN., June 8, 1857.

MESSRS. TUCKER & SON—The subject of all our inquiry and solicitude at this time, is Grasshoppers. I have enclosed several specimens for examination. We want to know what to expect of them for the future. The history of them here, as far as known, is that the last of August last year, full-grown grasshoppers began to appear in our fields, and in a short time there were millions. They came from the northwest. It is said that three years ago they were at the Red River of the North, about 500 miles from here. About the last of September they commenced to deposit their eggs in the ground, any where; the hard roads were covered with them. They void from 20 to 35 eggs each. This spring they have come out, and are taking away everything that is green. Some of our wheat fields are as bare as the inside of our hands. Corn, oats and beans disappeared as soon as up. From present appearances we shall not be able to grow any kind of crops. Please give us a scientific description of them as soon as convenient, through the Country Gentleman. Truly yours, C. W. WOODBURY.

Answer to the above by Dr. Fitch.

MESSRS. TUCKER—The intelligence from Minnesota, in the communication from Mr. WOODBURY, is truly alarming. Such facts are within our knowledge as clearly show that the grasshoppers of this country are analogous, in every respect, to the migratory locust of the east, whose career in all ages has been a series of the greatest calamities which have ever befallen the human race. "We are the army of the great God, and we lay ninety and nine eggs; if the hundredth were put forth the world would be ours!" Such is the song which the Arabs say the locust sings. No aid of oriental poetry, however, is required to impress us with the pitiable condition of a country which has been invaded by these creatures—where every particle of vegetation has been devoured, and not a mouthful of sustenance is left for either man or beast; where the inhabitants are obliged to scatter themselves with haste into other countries, to avoid starvation, and the whole land, in place of its previous bright green mantle of luxuriant verdure, is changed to a dreary, dismal waste, blackened as though fire had passed over it, and solitary, save here and there a miserable being striving to dig from the earth a few roots to keep him from starving. The history of the locust presents to us repeated instances of scenes like this. And it is only because the grasshoppers of our own country have never yet multiplied to the same extent, that we have not experienced similar calamities here. But, as I have often stated in my public lectures, we have every reason to apprehend that, as time rolls onward, instances will here occur, that will parallel what is related of the locust in the old world. And with such tidings as Mr. Woodbury's letter brings us, our strongest fears may well be excited at the prospect now before our neighbors in Minnesota. If these grasshoppers, early in June and before any of them are grown to half an

inch in length, if now when they are just hatched from their eggs and are still in their feeble infancy, they are so numerous and ravenous as to consume every green thing, rendering the "wheat fields as bare as the inside of our hands," and causing "corn, oats and beans to disappear as soon as they are up," what must be the condition of things there the coming August and September, when these same insects have grown to two inches or more in length, and their voracity has increased in the same ratio with their size and strength? Unless Divine Providence interposes, by flocks of birds, by predaceous insects and other natural causes, to cut off the greater part of this pestilent race before it reaches maturity, it appears inevitable that portions of that territory will this year be devastated in a manner that will appal us, and will everywhere excite the liveliest sympathies in behalf of our unfortunate fellow citizens who are residents there. Let us congratulate ourselves that we live in an age and country where intelligence and enterprise have furnished such facilities of intercommunication, that destitution and suffering, in any district, is relieved as speedily as it becomes known; and that nothing short of such a wide-spread and universal scarcity as we have no reason to regard as being possible, can ever produce in our land such instances of famine and its attendant pestilence, as have often occurred in former ages and are still liable to occur in many parts of the world.

The specimens sent by Mr. Woodbury are too young to determine their species. They merely show that the insect is an ordinary looking grasshopper of a black color, vaguely mottled and variegated with ash-gray or dull white, which color often forms a very distinct stripe along each side of the body its whole length. We shall be much obliged to Mr. W., if, when they have acquired their wings, he will pack a few of them in dry sawdust, in a small box, and send them to Albany to us. There are many kinds of these insects in our country, and if this proves as destructive as we apprehend, we are all deeply interested in knowing which particular species it is, and how large a district it inhabits. It is plainly different from the Red-legged grasshopper (*Acridium femur-rubrum*) which is our most common species here in New-York; and though this is one of the smaller kinds, growing only to an inch in length, or less, it destroys an immense amount of valuable forage in seasons when it is greatly multiplied: and when it has been most numerous, it has been known to become gregarious and migratory, exactly like the locust of the east, myriads assembling together in a flock, taking wing, and appearing like a cloud when at a distance in the sky; and wherever the swarm alights for a day or two to feed and recruit, every particle of green vegetation is consumed, causing the spot to appear as though burnt over with fire. It is surprising that the most unpalatable weeds, which no other animal will eat—the bitter May-weed, the acrid Butter-cups, the nauseating Lobelia—are devoured by these insects, apparently with the same relish as plants that are most mild and fragrant.

We hasten to present the manner in which these insects are to be subdued; and we regret that before this information can reach our Minnesota friends, the most favorable time for combating them, namely, when they are young and small, will be past.

It may be remarked that in the case of no other insect have we so much light with respect to the best modes of conquering and quelling it, as here, where in the case of the locust, the attention not merely of individuals, but of the governments of many different nations since the earliest periods of time, has been directed to this very subject. And the only mode which long and ample experience has shown to be efficacious and reliable for subduing these creatures, is simply gathering and destroying their eggs before they have hatched, and capturing and killing the insects when they are young. And so important and indispensable

is this work known to be in those countries which the locust inhabits, that to excite the inhabitants to engage in it with sufficient zeal and energy, bounties are paid from the public treasury for gathering these eggs and insects at a specified period of the year. In seasons when they are so numerous that quantities of them can be readily obtained, these bounties render it an object for the whole population to lay aside their other employments and engage entirely in this business. I regret that I have mislaid a memorandum stating the immense number of locusts that were hereby destroyed in the vicinity of Smyrna a few years since. The government of France, it is well known, is in advance of every other in the sedulous attention which it gives to every subject of this kind, in which the public welfare is in any degree involved. And though the locust is not a common insect there, yet a bounty is paid to promote the destruction of all insects of the grasshopper kind. A thousand dollars are some years disbursed in this way in some single counties (departments) bordering on the Mediterranean, where the insects are most numerous—about four cents per pound being allowed for the eggs and half as much for the insects. The chase begins with the month of May and continues through June; and the entire population of some villages, including the women and children, are accustomed each year to engage in it. An experienced boy, by hoeing in rocky places where the soil is shallow, will gather 12 to 15 pounds of eggs in a day, which hatched would produce half a million of locusts and over. To capture the insects, four persons drag a large piece of stout cloth briskly across a field, two in front drawing the fore edge along upon the grass and two behind holding the hind part of the cloth slanting upwards at an angle of about 45 degrees. The cloth we presume is made stiff by slender poles, sewed, one in its front and another in its hind edge, for we cannot conceive how it could be readily managed otherwise, especially upon a windy day. The insects jumping up from the grass to escape, are caught upon this cloth, and when a quantity are gathered, it is folded over them and they are then brushed or shaken into a sack. The women work singly, with a net similar to that used by entomologists for sweeping the grass and weeds to collect the small insects therefrom; and they sometimes gather herewith more than a hundred weight in a day. This information we obtain from an article in the Transactions of the Entomological Society of France, vol. ii, p. 486.

The Chinese, also, secluded from intercourse with all the rest of the world, have learned that this same method was the only effective one for subduing these insects, as appears from "an edict for the capture of grasshoppers," issued by some of the officials to their subordinates, which we meet with in Williams's Middle Kingdom, vol. i, p. 272. In this it is stated, "We now exhibit in order the most important rules for catching grasshoppers. Let the governor's combined (military) forces be immediately instructed to capture them; at the same time let orders be issued for the villagers and farmers at once to assemble and take them, thus without fail sweeping them clean away. If you do not exert yourself to catch the grasshoppers, your guilt will be very great. Let it be done carefully, not clandestinely delaying, thus causing misfortune to come upon yourselves. * * * When the wings and legs of the grasshoppers are taken off and they are dried in the sun, they taste like dried prawns, and moreover they can be kept a long time without spoiling." But we have not space for further extracts from this curious document.

From what has been adduced, our Minnesota neighbors will perceive that the only feasible mode by which they can rid themselves of these insects, is, to capture and destroy them. Their numbers, however, are undoubtedly so vast that to make any perceptible impression upon them, the combined exertions of the whole population will be necessary—such a concert as can scarcely be obtained, except by some legislative en-

actment. A single person, however, can probably sweep most of these insects from his own fields, with less labor than is often bestowed upon objects of less importance than this is. A net which will be very effective for this purpose may be constructed as follows: Make a bag of stout cotton cloth, somewhat tapering, and about three feet in length and eighteen inches in diameter at its mouth. Sew the mouth of this bag to a coarse stiff wire, bent into a circle of the same diameter, to which a handle about three feet long is firmly attached. Sweep fields of grain or grass with this implement, by swinging it from side to side in front of you, as you advance, like a man engaged in mowing. A little practice will render one dextrous in using this net; and every person will be astonished at the confused medley of grasshoppers, flies, beetles, and all sorts of queer looking bugs, worms and creeping things, which in some places will be gathered by it. As most of these are depredators upon the vegetation on which they occur, they may all be emptied together into a sack, and killed by pouring boiling water upon them, and fed to the swine. How effective such an implement is for work of this kind is shown by the fact stated above, that the women in France sometimes gather a hundred weight of grasshoppers in a day with it. The same work, however, can be much more expeditiously accomplished, no doubt, with two or three sheets sewed together, or a piece of canvass of similar size, managed by three or four persons in the manner above spoken of, as practiced in France. In one or the other of these ways a field may be almost entirely cleansed of these vermin, by passing over it two or three times. And if the crop can be saved from ruin hereby, it is evident that it will amply repay the labor which is thus bestowed. But where the whole country around is thronged and overrun with these insects, it is probable they will soon come in from the surrounding fields and reoccupy any spot which is made vacant; in which case repeated sweepings may become necessary.

As I close this communication, the rain is pouring down copiously, which reminds me of the fact that these insects are supposed to thrive the best and become most destructive in dry seasons. Therefore if the summer proves to be as wet in Minnesota as it has been and promises yet to be in this vicinity, it may in a great measure avert the calamity which appears to be there impending. ASA FITCH, June 30th, 1857.

Deep and Shallow Plowing.

MESSRS. EDITORS—I have perused with interest the remarks of A. L. L., vol. ix, p. 410, on my hasty communication "on deep and shallow plowing," in January last. Had I for one moment supposed that anything I could say would be thought worthy the notice of a farmer of the Empire State, I should have been more careful how I said it. I presume I must have been quite careless in what I wrote, as he represents me as urging plowing, on all soils, under all circumstances, to be done at least twelve inches deep. I am quite sure I did not advocate this, for I never entertained such a thought. The most I could have urged was, to so plow as to gradually deepen the soil, until by fertilization or otherwise, it would bear to be stirred to the depth of twelve inches. This I now say is expedient and proper on all lands fit to be cultivated at all, be they sandy, gravelly or loamy. If the natural soil is shallow, gradually deepen it, and fertilize accordingly. What is worth doing at all, is worth doing well. Merely because the plow has never penetrated more than four or six inches deep, is no good reason why it should not be made to penetrate much deeper. I respectfully say that your correspondent's shallow notions will not bear the test of experiment. I have seen the coarsest gravelly soil we have, improved more than one hundred per cent. by six inches additional stirring, and a liberal dressing of manure from the hog pen, and 46 bushels of rye to the acre, worth \$1.50 per bushel, was the consequence. P. Essex Co., Mass.

The Grazier.

Mr. Sotham in Reply to C. M. Clay.

MESSRS. TUCKER & SON—I should be exceedingly sorry to involve you in any difficulty with your readers, but I have a strong desire to use my own weapons in my own defence.

I will defy any man to prove that I ever commenced a controversy, and am always willing for a just public to criticise my articles as they deem proper. When I deviate from the truth, *trium* me with a severe pen.

Mr. Clay says:

"Mr. S., avowedly, upon personal observation, attacks my herd. I show he never saw it. Instead of an apology he attempts to cast upon me imputations of untruths, as an offset to that which I had proved upon him."

You will observe, Messrs. Editors, in Mr. Clay's former letter, which I send you, he says:

"If through mistake he applied his remarks to me, instead of my brother, B. J. Clay, I need only say he took more premiums," &c., &c.

I said in my letter in the Hereford Journal and Mark Lane Express, to which Mr. Clay alludes, that I was sorry for that "mistake," as I fully understood the herd belonged to Mr. Cassius M. Clay. I then transferred the remarks I made to where they belonged, and contend that every word I said of that herd was strictly true. Mr. C. M. C. then joins his and his brother's herd together, making them one, from which he issues the challenge which I accepted in my answer, which was as follows:

I will now for a finality, propose to meet Mr. Clay's "challenge" in an *fair way*: I have two heifer calves, 'Trudenes,' calved August 29th, 1856; 'Woodark,' calved Sept. 30th, 1856. These are all I have left this season. They ran with their dams, as long as any grass, when the cows came to winter quarters, they were allowed to suck their dams once a day; about the 20th of December they were taken away, and now live on cut chaff and cut corn stalks, mixed, with about a pint of oat meal each per day, mixed with their chaff; one common sized 'rutabaga' per day, cut up between them, to keep them regular and in growing stock order, as I do not believe in forcing calves; as spring and warm weather approaches, I shall increase the roots, and keep to about the same quantity of oat meal. These calves shall be turned to grass in the spring, until next fall, when I will bring them with me to Kentucky at the National show; place them in any honest Kentucky grazer's hand, against any two heifer calves now owned by Cassius M. or Brutus J. Clay, of a similar age; if they have not any exactly the same age, a few months difference must be allowed for accordingly. The two calves shall be weighed when delivered to the receiver—the feed to be weighed the whole year, and at the end of it, all four of them again weighed. The following year shall be pursued with the same treatment; coming in at three, again at four years old. They shall be milked both seasons, each as long as she will hold out in milking under the just and economical management of their receiver; the butter regularly weighed, and disposed of by him, he reporting quality, and giving a just account at different times, as he deems right. At the end of this trial they will be five years old; they shall be fed for one year, or two, as agreed upon, the two heifers that make the most butter and most beef for the food consumed, to be the winners. The quality of beef at the "block" to be taken into consideration. Each pair of heifers to be charged with what they eat, of each kind of feed, all living on the same, and allowing them a good and sufficient grazer's quantity through the whole trial, the losing heifers to be forfeited to receiver to pay expenses. Pedigree of heifers to be given at the time of delivery. There are plenty of men in Kentucky that will not fairly between us.

Mr. Clay distinctly says two heifers (yearlings) from his own herd—"Or in case there are no heifers of the same age, or near the same, I will show two Short-horn females of any named age of my own and my brother B. J. Clay's herd, against any two Herefords of any two breeders in America, owned and bred by the same parties."

I had no heifers to accept the former, therefore accepted the latter, placing it in a permanent position, and I think in perfect fairness. I have no doubt my heifers will be much the smallest, when they first meet, because of the different treatment in their food; but the test will be when all live alike, and weight of food each consumes: the quantity and quality of which is to be left to a disinterested grazer, who is competent to make such a trial.

Is it Kentucky etiquette to require any further apology? And I ask Mr. Clay if it is "keeping inside the rules of gentlemen," to pounce upon a man and say "he had proved an untruth upon him," for so trivial a

mistake? I think Mr. Clay could not mean what he wrote. If he did, my "Englishism" will not succumb to it, and my Republicanism is too "independent" to think of any further "apology."

Mr. Clay says:

"I made certain points: the basis of an estimate of what constitutes the best breed of cattle. Mr. S. professes to be a practical man, yet while affecting to ridicule my articles, he has not ventured to attack a single postulate, there laid down by me. Mr. Sotham sneers at me as a breeder and dealer."

I must say I could not help laughing heartily, and in my mirth could not refrain from ridiculing so preposterous a "postulate laid down" by Mr. Clay, when he says, "I had only one half of the Bull Locomotive at the National Fair at Springfield, Ohio, who took the first premium in his ring, against the world." After laying down this "postulate," he brings forward his long established career "as a breeder and dealer" to endorse his opinion and judgment.

This I certainly did attack by *ridicule*, for I could not see it in any other light, nor have I any reason now to alter that position.

Another postulate Mr. Clay laid down—that he "had a robust family of Short-horns which he had adopted in preference to a delicate family of the same breed he had previously owned and disposed of." The former he said "was as good as could be found in the world." This also I attacked by *ridicule*, as I could not see that in any other light, and I may have "sneered" at his judgment by producing such a herd, as I thought was his at the time I made those remarks. That supposed sneer I will retract until "I see his herd."

Another of Mr. Clay's postulates. He says—"The cow of mine which weighed 2020 pounds, which her owner refused \$140 for, was not much stuffed; yet I will venture to assert that there is no Hereford in America which will weigh as much, or bring as much money at the block. The above 'facts,' if not 'proof,' can be proved by certificates, if we are to go outside the rules of gentlemen in this discussion." This I attacked, and proved that my cow, with two months less feeding, beat her nearly 300 pounds, and fetched more money.

Mr. Clay said in another, that "the Durhams were the best breed of cattle." I denied this, and said the Herefords were better, and considered the "postulate" I laid down quite as good as his.

The next postulate was that the Short-horns were an uniform breed, and that I admitted this by saying, the "pictures" copied from the American S. H. Herd Book, were all as if copied from the first. I denied this, and said the "pictures" were all *very stiff*, made up of straight lines; their tops and bottoms appeared as if made with a ruler, while many of the animals that I knew, had "hollow crops" and large paunches, which no one could perceive in the "picture"; and what can a man tell about uniformity of handling quality, (the most important point to a breeder) in a "portrait."

Another postulate laid down by Mr. Clay, that "Short-horns were best for early maturity." I referred him to the records of the Smithfield Club for positive proof of the contrary—showed him where two year old Hereford steers had won the gold medals against Short-horns in the same class, four, five, and six years old. I also produced the weight of Mr. Heath's two year old Hereford steers, and the ten two year old Herefords on exhibition at Birmingham by Sir Francis Lawley, and challenged him to produce Short-horns of the same weight. This was proof of early "maturity." I complained of Mr. Clay's articles not showing a "single" proof, and still ask him to point one out to me in either of them.

I think Mr. Clay made a mistake when he said I did not attack a single postulate laid down by him. I considered that many of them did not require an attack as they sufficiently answered, when brought before an enlightened public, themselves.

The strongest postulate Mr. C. professes to lay down in favor of Short-horns, is that they are the best for his

"isothermal belt." My object in accepting the challenge as I did, was to meet him fairly on his "own isothermal belt." Neither can I be "bluffed off" by his last challenge to meet this just trial; the heifers shall be there as I proposed.

Mr. Clay says—"I propose to show my herd which was attacked, against the best selected herd of Herefords in America. I ask any gentleman, if that was not a fair proposition. I gave him the advantage of a thousand to one against me." What Mr. Clay means by the latter I cannot imagine, as I think it would be difficult to find a thousand thorough-bred breeding Herefords in America, and those mostly descended from Mr. Corning's and my importations, while Mr. Clay admits that he for "many years has grazed a thousand cattle a year." If a man cannot produce "one good beef" for show out of such a number, farewell Short-horns. Neither have I ever seen the above challenge. If Mr. Clay has made such a one I ask him to produce it.

One more postulate Mr. Clay lays down—"that the Herefords have never contended for the supremacy."—I referred him to the Smithfield and Birmingham Clubs for proof of this, and in which he will find the Herefords are "ahead" of all other breeds, in prizes. If there is any other favorite postulate Mr. Clay has laid down that I have not attacked, I will cheerfully do it, or admit the "facts" as my opinion dictates.

The preposterous postulate he lays down that his heifers are worth \$2,000, and mine nothing. I consider only as a *dernier resort*. I could say the same by Mr. Brutus J. Clay's herd.

I will now call your attention to Mr. Clay's last challenge. In the first place I have not \$2,000 to risk, or even if I had I have not the principle to accept, and I consider the challenge a ridiculous one. "One cow" may have good crops, while many other points are miserable. "One cow" may be a good handler and her symmetry inferior, or just the reverse, and probably one fat Hereford cow cannot be found in America. I will therefore in addition to my former acceptance, propose to show my stock Hereford bull against Locomotive, as I previously proposed to do against the Marquis of Carrabas, and on the same terms. I will show him against Mr. C's present stock bull, and that of his brother, Brutus J. Clay, stating number of cows served in the season. I shall also bring altogether to Kentucky, some eight or nine animals of different ages, &c., sufficient to show a specimen of a breeder's herd, which I will show against Messrs. C. M. and B. J. Clay. I cannot agree to leave it to the judges on sweepstakes, as the chairman may be a Short-horn breeder, and a prejudiced man. I will name my judge, Mr. Clay his, those two naming the third; and a true certificate and diploma from our worthy president, Mr. Wilder, would be as binding and as meritorious as if tied with a chain of gold or a band of bank notes.

I consider the true value of the two yearlings I intend to put against Mr. Clay, to be \$125 each, and contend there are no two heifers of any breed, or of the same age, in America, really worth more.

Our stage shall come to show according to the rules of the society, in fair breeding order, *not loaded with flesh*; then we will have no one to blame but ourselves, if we do not select judges capable of knowing a good animal in its proper state. What use is it for societies to adopt rules, if exhibitors are not *compelled* to live up to them, and no man should ever be put on as judge who cannot distinguish a good animal in breeding condition, from one loaded with forced second and third quality flesh. The "fact" is, judges generally look at flesh, no matter of what quality, in preference to handling.

Distinctly admit that these are very "fast times," and I cannot help thinking Short-horn men are a *little fast*, even to correspond with them. I think they lay down "postulates" they cannot maintain, and by which the community is led astray. It was never practically intended that cattle brought to exhibition, should be washed, groomed, blanketed, and fed for that purpose like *race horses*; their horns scraped, and their "long silky" Scotch coat, oiled, to attempt to deceive the handler. I consider such treatment an insult to proper judges. No animal can look better before judges, than one in breeding condition, and in its natural state. Any thing forced beyond this, a good judge will condemn, as it does not correspond with good breeding.

When any of your impartial readers can prove calumny, &c., in any of my letters, I will retire from the field disgusted. WM. H. SOTHAM. Owens, N. Y.

P. S.—I send you the weight of my Hereford stock bull, weighed this morning in presence of several witnesses. Weight 1860 pounds, in *low flesh*, and served sixty-three cows from March 11th to July 3d. I shall limit him to 20 more, before the show. I will not fill your paper up with his "pedigree," as that will be exhibited with him; he was calved in the autumn of 1850.

Entomology.

No. XIX.—Beetles Infesting Grape-vines.

D. A. A. N. of Westfield, Chautauque Co., requests information as to the name, commonness, &c., of a large tawny yellow beetle, having four equidistant black spots along each side, which has this season been observed for the first time in his vicinity, upon the Isabella grape-vines, feeding very voraciously upon the leaves.

In addition to answering this inquiry, it will probably be an acceptable service to the readers of the COUNTRY GENTLEMAN, to have presented them in one view, a short account of the other beetles of our country which are at present known injurious to grape-vines, as some of these are appearing upon the vines every year, and should be picked off and destroyed whenever one of them is seen.

The Spotted Pelidnota (*Pelidnota punctata*) is the name which has been given in books to the large beetle referred to by Mr. N. It belongs to the *Scarabaeus* family, the insects of which may be distinguished by having shortish antennae, ending in a large knob formed of three or more flattened plates which open apart like the leaves of a book, and the end of their body covered and hid beneath the ends of the wing covers. This beetle is of an oval form, nearly an inch long and half an inch broad, of a shining pale brownish-yellow color, resembling the hue of a faded leaf, and is at once distinguished from every other similar insect, by having a very large black dot on each side of the thorax, and three others along the outer part of each wing cover, these four dots being nearly in a straight row at equal distances apart, as will be seen in the accompanying cut. The back part of the head is dark bottle green, and its under side and legs are greenish black, with the thighs sometimes chestnut color. This beetle occurs in July, August and September, in all parts of the United States, both upon the wild and cultivated grape-vines. Every year I find a few of them upon every wild vine I examine, but I have never known them to be numerous. They however, are so large and so voracious, that quite a number of leaves are probably consumed by each one of them.

The Light-loving Anomala (*Anomala lucicola*) is a beetle of the *Melolontha* family, in which the antennae are the same as in the foregoing, but here the end of the body is not received beneath and covered by the ends of the wing covers. This beetle is of a similar oval shape to the preceding, but is much smaller, measuring only thirty-five hundredths of an inch in length. It varies surprisingly in its colors, from pale yellowish to pure black, presenting hereby four varieties, which are so distinct and well marked that they would be taken for different species, and three of them have been named and described as such by Fabricius. They may be briefly distinguished as follows: 1st. The Gloomy Anomala, (*marrens*, Fab.), of a pale dull yellow color, with the thorax sometimes reddish, and with the knob of the antennae and the middle of the breast, black. 2d. The Spotted-necked Anomala (*maculicollis*) is like the preceding, but has a black streak, or a large black spot, on each side of the middle of the thorax, and often the hind part of the head and the outer side of the wing covers are also black. 3d. The true Light-loving Anomala (*lucicola*, Fab.) is pale dull yellow, with the thorax black, except on each side and on the middle of its hind edge; the hind part of the head, the scutell or small triangular piece between the base of the wing covers, and the under side of the body being also black, with the abdomen, or hind body, brown, or sometimes dull yellowish. 4th. The Black Anomala (*atrata*, Fab.) is black throughout, except sometimes the abdomen, which retains a paler tinge. These beetles are common on both the wild and cultivated grape-vines during the month of July, feeding upon the leaves, and are much more voracious in proportion to their size, than the preceding species.

The Rose bug (*Mecanodactylus subspinosus*) also pertains to the *Melolontha* family of beetles. It is of the same length as the Anomala, but is more narrow and shining in its form, and of a buff yellow color, with oblong yellow legs, and very long black feet. A full account of this beetle was given in the Country Gentleman three years since, (vol. viii, p. 75,) and I therefore need only say, in this place, that this insect is liable to appear in excessive numbers, and be very destructive in particular districts, whilst overall the rest

of our country it is seldom or never seen. Where it abounds it is most injurious to rose bushes, to grape-vines, and apple trees.

To destroy the Rose bug, I in the article above referred to, recommended the turning of poultry among the infested vegetation; but as I stated that this insect had never appeared in my own vicinity, except a solitary specimen occasionally found, the reader would certainly understand that I did not speak of this remedy from any personal knowledge, which it was possible for me to have in the premises, but from information derived from other sources than my own observation. My recommendations was based chiefly on the statements of Dr. HARRIS, in whose neighborhood these insects had been very numerous. In his Report on Insects, to the Massachusetts legislature, April, 1838, page 72, he says: "Our insectivorous birds undoubtedly consume many of the rose bugs in the perfect and larva state, and deserve to be cherished and protected for their useful habits. The perfect insects are also eaten greedily by domestic fowls." Testimony cannot be more explicit than this, and it cannot be supposed that Dr. Harris, residing where these insects abounded, would make such a statement, unless he had actual evidence that the fact was as he says. Yet, in a communication from C. B. MECK, published, page 106 of the same volume of the Country Gentleman, alluding to the remedy I had recommended, he says that poultry will not eat these beetles. We sorely know what to think where testimony is so conflicting. Will hens eat rose bugs? They devour them greedily, says one. They will not touch them, says another. And both these witnesses are probably testifying to us honestly of what their own eyes have seen. We are therefore bound to believe them both. I do believe them both; and this will continue to be my faith, unless further researches show that one or other is certainly in an error. With Dr. Harris, I believe that hens devour rose bugs greedily. I doubt not a hen, when she is placed for the first time among bushes thronging with these insects, will instinctively pick them up rapidly as she would kernels of corn, swallowing them till her crop can hold no more. Each insect has six feet, ending in a pair of claws, the ends of which are cleft or split apart, and are sharper than the points of needles. Thus there are twenty-four of these sharp prickles to each insect, and these, we may well suppose, produce an amount of irritation in the crop of the hen that is perfectly tormenting to her. And after such such experience as to the effect of eating these insects, she probably becomes a *vegetarian*, and adopts a policy of "total abstinence," never afterwards permitting any of these "evil spirits" to pass her lips. With Mr. Meck, I believe that hens will not touch rose bugs.

Finally, the grape-vine flea beetle, (*Italica chalybea*), of the *Chrysomela* family, is a very small oblong oval beetle, six-and-a-half hundredths of an inch long, and skipping like a flea. It is polished and sparkling, of a deep greenish-blue color, but varying in particular individuals to deep green, purple and violet, with the under side dark green, and the antennae and legs dull black. This beetle perforates numerous small holes in the leaves, instead of eating large irregular portions of their sides or ends, as do those before mentioned. It is nearly thirty years ago that this flea beetle was first noticed as injurious to the vine, in Cayuga county, of this state, by Dr. VIN THOMAS, who gave several valuable facts respecting it, in an article published in Silliman's Journal, vol. 26. He noticed small, smooth, chestnut colored worms eating the vine leaves, and on feeding some of these in a tumbler of moist earth, he found they at length buried themselves and about a fortnight afterwards the perfect insects appeared in the tumbler. It is probably the latter part of the season that these beetles hatch from their pupae in the ground, and ascend the vines, feeding on the leaves till these are destroyed by the frost, when the increasing coldness of autumn drives them into their winter quarters. They now travel down the vines, as many as can crowd themselves beneath the loose scales of the bark. But this covert being insufficient to accommodate but a small number, the rest crawl slightly under the loose particles of dirt immediately around the root. It is in these situations that I have found them, torpid, in the winter. When the warmth of spring returns, they revive, and again ascend the vines in search of food, and it is now, before the leaves have put forth, that they do the most serious injury, as Mr. Thomas observed, eating into the swelling buds and devouring their central succulent parts. They are sometimes so numerous that every fruit bud is destroyed, and the vines are thus rendered barren for that year. And they are long deposit, probably upon the young leaves, the eggs from which hatch the small worms above mentioned.

I am confident the readiest mode of subduing these small flea-beetles, whenever they become numerous upon the vines, will be to search them out early in the spring, before they leave their winter retreats. Most of them are then clustered together, and lying torpid in the ground close around the roots of the vines, and may be scraped up and destroyed with little labor. Or

will not boiling water poured upon the ground kill them without injuring the vines? Experiments only can show whether this is an efficacious measure. These being destroyed, the few which remain beneath the loose scales of bark will probably be insufficient to cause any perceptible amount of injury.

As to the other beetles above mentioned, the best advice I am able to give, is for every vine-grower to make himself acquainted with the appearance of these enemies, so that he can readily distinguish them from other beetles which are liable to occur upon the vine, some of which are beneficial, and are attracted to this spot to feed on worms, lice, or other vermin there, and should hence be allowed to remain unmolested. But whenever one of these depredating beetles is seen, it should be picked off and crushed beneath the sole of the boot. ASA FITCH. Aug. 25, 1859.

Leaves as a Manure.

In the multitude of farm operations which can be performed without draft upon the pocket, or in other words, which can be accomplished without its costing a large sum in ready cash, but which will add greatly to the resources of the farm, and the ultimate wealth of the owner, none are of more importance than the formation of the compost heap. Farmers waste a great deal in the course of a year, which if it were carefully taken care of and treasured up, would be of incalculable value.

Now look for a moment at the economy of composted manure. The materials which contribute to it are in themselves comparatively worthless, and the time spent in collecting them together and placing them in a proper position for decomposition, may not interfere with the other labors of the farm, as it can be done at intervals of half days, &c., &c. The items which go to make up the compost heap are innumerable. Old bones, soap suds, rag, leather, refuse of factories and tanneries, carcasses of dead animals, &c. Swamp muck, fine charcoal, and small portions of plaster should form a large proportion; in fact any and every thing that will decompose will make manure, and should be gathered up.

Leaves, where they can be collected in large quantities, as in many of our forests, may be made highly useful in augmenting the manure or compost heap. Indeed a recent agricultural writer says that every acre of woodland would afford a pretty fair dressing for an acre of corn, if the leaves were gathered and composted. JOHNSON, in his Farmer's Encyclopedia, recommends their use and says—"they do not easily rot, but that I think is no objection to their use; they are a sponge to be saturated with urine, and if not touched previously to carting on to the land, (after having been used as a litter for cattle,) will convey much of what might otherwise be lost." Leaves are valuable as a litter for stable, being an absorbent of the liquids—and quantities of them may be put into the hog pen with profit—but their greatest value as a manure will be found when composted, and this same remark may apply to straw, &c. Suffered to decay in the open air, the greater part of their value is lost, while buried in the compost bed, all becomes saved and makes a fine manure.

Farmers who live contiguous to forests and woodlands should gather large quantities of leaves this autumn, to be used chiefly as a part of the material for compost, and as litter for stable, cattle stalls, hog pens, &c. L. S.

Remedy for Twitch Grass.

This is one of the thousand and one names by which this pest is known. Several years ago I had a piece of land that wanted to be taken up, but it was so full of the roots that I dreaded the job; but about the same time I saw a piece in an agricultural paper, that the editor had killed it by planting the land to potatoes, and after they were dug he turned a drove of pigs into the field. So I tried it, and with perfect success. The land was so full of roots that I got but a small crop of potatoes, but the next spring when I came to plow the land, there was none to be seen. If any farmer has his farm as full of it as mine was, let him try this and he will gain two things—fatten his pigs and rid himself of this pest. SAGADOG.

RAISING COLTS.—Jacob Strawn, the great Illinois stock-grower, says he can raise five colts large enough to use, cheaper than one steer, but the trouble with the former is, that you cannot sell a lot of colts together for the cash as you can steers. His stock horses run out all winter—he wintered over seventy head last season, without grain of any description. They did not all eat over six tons of hay, having the run of a blue grass pasture, with water and brush in it. He never weans a colt, or catches the horse to put to mares, but turns them together to do as they please. This is "wholesale prairie farming."



Cooking food for Swine.

A Kentucky farmer has been making experiments in feeding several lots of hogs, changing them from raw to cooked, and from ground to underground food. The results of these several trials are communicated to the N. Y. Tribune, from which we give the general estimate.

One bushel of dry corn made five pounds and ten ounces of live pork. One bushel of boiled corn made fourteen pounds and seven ounces of pork. One bushel of ground corn, boiled, made in one instance sixteen pounds seven ounces, in another nearly eighteen pounds of pork. Estimating corn at ninety cents a bushel, and pork at 8 cents a pound, we have as the result of one bushel of dry corn, 45 cents worth of pork; of one bushel of boiled corn, \$1.15 worth of pork, and of one bushel of ground corn boiled, \$1.36 worth of pork.

Cotswold Sheep.

Col. J. W. Ware of Va., writing on the question, "Are Sheep or Hogs the most Profitable Animal to Fatten?" to the *Genesee Farmer*, says:

"Of all sheep, I prefer the Cotswold, from experience. They mature early, are large, hardy, and take on fat easy. During the summer and fall that they are one year old, (not fed on grain,) no mutton can be more delicately flavored, juicy and tender. Over two years old, many muttons are better, as they then follow too heavily for the appetite; but the butcher will then give almost any price for them; and what prudent man wishes to keep muttons to four years old, when he can sell them at one year old at much better prices than any other sheep at four? I have rarely, if ever, sold my muttons of this breed, the fall after one year old, under \$10 each, and have sold older ones much higher; and never sold them at the same age under \$8 each without having fed grain at all; and the fleece amply pays the keep. Can any breed of hogs show such clear profit and in so short a time? and they have no wool to pay cost of shep."

Training Oxen.

The following sensible remarks upon this important but neglected branch of farm operations, is furnished to the *N. E. Farmer* by Charles A. Hubbard, of Concord, Mass. It is better to have a good team than a poor one, and a good team depends upon good management and careful usage.

A word on training oxen. I have found that by far the best time to train steers is when they are calves, say the first winter. Oxen that are trained when quite young, are much more pliable and obedient, and this adds much to their value. Steers that run until they are three or four years old, are dangerous animals to encounter. They are always running away with the cart or sled, whenever there is a chance for them, and often serious injury is the result. I would not recommend working steers hard, while young, as it prevents their growth; there is a difference between working them and merely training them. I have observed that very little attention is paid by our farmers to train their steers to back, but as they become able to draw a considerable load forward, they are often unmercifully beaten on the head and face, because they will not back a cart or sled with as large a load as they can draw forward, forgetting that much pain has been taken to teach them to draw forward, but none to teach them to push backward. To remedy the occasion of this thumping, as soon as I have taught my steers to be handy, as it is called, and to draw forward, I place them on a cart where the land is a little descending; in this situation they will soon learn to back it. Then I place them on level land, and exercise them. Then I teach them to back a cart up land, that is a little rising, the cart having no load in as yet. When I have taught them to stand up to the tongue as they ought, and back an empty cart, I next either put a small load in the cart, or take them to where the land rises faster, which answers the same purpose; thus in a few days they can be taught to back well, and to know how to do it, which, by a little use afterward, they never forget. This may appear of little consequence to some, but

when it is remembered how frequently we want to back a load, when we are at work with our cattle, and how convenient it is to have our cattle back well, why should we not teach them for the time when we want them thus to lay out their strength? Besides, it often saves blows and vexations, which is considerable when one is in a hurry. I never considered a pair of oxen well broke until they will back well with ease any reasonable load, and I would give a very considerable sum more for a yoke thus trained.

Summer Care of Colts.

The following practical hints on this subject we copy from the *Genesee Farmer*:

Mares with foals by their sides are always better to keep in pasture, even if they are worked occasionally; and it is desirable, where they are to be worked, that they should be accustomed to leave their foals in the pasture while at work, allowing the foal to get to them only at noon, and after working hours. It is well to give the mare a feed of oats daily for a short time previous to weaning the foal. Let it be given to her in such a manner that the foal can be induced to partake of it, that the feed may be continued to him when weaned, as it is then essential to compensate him for the loss of the milk of his dam. If the colt is expected to turn out a superior animal, and the mare is not wanted to work, it will be conducive to that end that he should be allowed to run with the dam till he is a year old, before weaning, and then have a drink of new milk, fresh from a cow, given to him daily during the ensuing season. Two-year-olds are by no means to be so much cared for. Give them good pasture, plenty of room and water, and they are sure, if healthy, to grow and become fat. If intended for sale at the end of the season, they may be pushed forward still more by a feed of oats given daily. Young colts kept at grass should be placed in a pasture among either cattle or sheep, but not older horses, as they love to graze those precise spots not well relished by other stock, and from their playfulness they are apt to get kicked or bitten.

The Old Roman Ox Yoke.

The ancient yoke, still in use in continental Europe, is very light, rests on the oxen's heads, projects a flap on their forehead, which is protected by a cushion; and is strapped round their horns. Its merits, as stated by Prof. Mot, from France, in the *O. Cultivator*, are:

1st. It brings the line of traction as low as required by increasing difficulties; cattle lower their heads when force is to be applied—yokes on the top of the shoulders cannot do that.

2d. The head yoke cannot swing; it offers a steady fulcrum upon which both oxen act at once, their contiguous horns being cross-locked if long, or in a juxtaposition if short; consequently a lazy ox cannot stay two feet behind its mate.

3d. When the weight of the body is to be thrown against the point of resistance, all the surface of the head-yoke is acted upon; whereas the yoke resting on the neck has an upward tendency to escape, is only in contact with the ox by limited surfaces, is not fast; is too heavy."

The Wheat Midge in Canada West.

The *Toronto Globe* gives a letter from Mr. WADE of Port Hope, C. W., in regard to the habits of the wheat midge, and the best method of escaping its ravages, especially with spring wheat. His theory, which has been held for seven years, and is to his mind fully established, is—"that the ravages of the midge are confined to about 10 days; and that fall wheat which has shot before the 25th of June, has far all this time comparatively escaped; while both fall and spring wheat shooting between the 25th of June and the 7th of July, have been more or less injured; and then the spring wheat coming in after that time has escaped the midge."

Mr. W. adds, as the result of his observations for the present season in that vicinity, the following facts:

"The midge was first perceived on the wing on the 27th of June, and in that shape till the 7th of July. All wheat in head before the 27th of June, was not much injured; while all which shot between the 27th of June and the 7th of July, has much of the maggot in it. A neighbor has a field of Club wheat sown in the second week of April, clear of insect; while another piece of land sown with Fife at the same time is full of it. This is accounted for by the Club being ten days earlier in maturing. I have visited several fields in this neighborhood within the last two or three days. One field sown on the 3d of May, will be damaged nearly 25 per cent; another sown on the 8th will suffer about 20 per cent; and all I have yet seen which was sown after the 12th, is clear altogether."

Foul Seed Wheat.

NEAR GENEEVA, 2d Sept., 1859.

MESSRS. EDITORS—While at the railroad depot the other day, I met with a prominent farmer of Ontario county, who had just received two bushels of seed wheat, (or what he expected to be seed wheat), from a noted farmer, some fifty or sixty miles west of this place. After opening the bag, he asked me to look at it, which I did, and to my utter astonishment I found a great quantity of both chaff and cockle mixed with it, and I assure you it made me feel rather unpleasantly to think that after what I have written, and you printed for the last twenty-eight years, that such a noted farmer should have sent off such foul wheat to any man. Could I have supposed that he had made a mistake, and sent off a bag of screenings in place of a bag of seed wheat, I should have been better satisfied; still, for a farmer like him, who has taken pupils to instruct in practical and scientific farming, to have no more pride in or respect for farming, than to send out such foul stuff for seed, astonishes me. I have attended thoroughly to the cleaning up of 1500 bushels of wheat since harvest, and I know there was not as much chaff in the whole, before we commenced cleaning, as there was in four quarts of that wheat sent from one of the celebrated farmers of one of the most celebrated townships in western New York. The farmer who sent it must be a reading farmer, as he occasionally writes for the agricultural press, and I never knew a farmer a writer but who was also a reader, and you know, and thousands of others know, that I have, time after time, published my plan of cleaning chaff out of wheat, yet that farmer, for one, had taken no notice of it, else he would not have sent off such wheat. JOHN JOHNSTON.

In a P. S. to the above, Mr. JOHNSTON gives us the name of the gentleman from whom the foul seed wheat to which he alludes, came, for which we are greatly obliged, as it will save us the mortification of referring applicants for seed wheat to him for the future, as we have done in time past.

Retrospective Notes.

SORGHUM FOR FODDER, p. 157.—I have tried this crop thoroughly—it produces about twice as much fodder per acre as common corn—and like the latter succeeds much the best in drills three feet apart. It will give 12 to 16 tons of green fodder per acre, and half that amount dried about as much as is usual for fodder, which is not very dry. Sorghum is most valuable to feed in autumn when green—at which time cattle will devour it stalk and all. In the winter, when it becomes drier, cattle will not eat it, unless finely cut up—which should be done by horse-power, and with a machine cutting half the fourth of an inch long. Treated in this way, it is a most valuable food for milch cows, whose milk I have found to increase considerably after the feeding was commenced; and I believe when properly managed it will become by far the most profitable and economical winter fodder for cattle.

TO CURE KICKING COWS, p. 160.—The method described in the New-England Farmer, has not enough promptness, efficiency and system. I have cured cows, which could only be milked by courageous persons, after the legs were securely tied—cows that would compare favorably with Rary's celebrated Cruiser, by carrying out simply the following rules:

1. Never allow the slightest degree of heat or passion, or departure from perfect self-control.

2. Never strike the animal but once at a time—no matter what the provocation may be—a single, sharp cut with a switch (kept under the left arm), excites fear and alarm—two or more strokes produce a re-action and cause rage but no fear.

3. Adhere faithfully to the principles of cause and effect, and the animal will quickly understand these principles, if the single, alarming stroke always instantly follows every attempt to kick.

4. Treat the animal in a firm, soothing, gentle manner at all times,—only let the blow always come quickly after every kick; whether it be merely an abortive attempt, or the whole pall of milk is upset—the intention of the animal was the same.

I do not wonder that so many fine cows are spoiled, that are treated according to passion and caprice, and not according to principle nor rule. If a cow kicks maliciously, but happens to hit no one, the milker takes no

The Country Gentleman.

A Journal for the Farm,

the Garden, and the Fireside.

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Economy of Fodder—Saving Hay.

Not a very reasonable topic, the reader may think, but still not out of time in the light we propose to look upon it. Last winter, (Co. Gent. Feb. 17, 1859,) we spoke of "managing it right" to make the winterstore of forage go as far as possible, by feeding without waste, and by providing shelter, &c., for the comfort of our stock—now we propose to offer a few remarks on cutting, curing, and storing the same, with a view to the best economy of its value.

With many of our readers, the hay crop of the present year will be a short one—the season having been less favorable to the growth of grass than usual in many localities. So we must save what there is—save it closely and carefully—at the proper time. In a recent number, (Co. Gent. June 23, 1859,) will be found a carefully considered article on the best methods of making good hay—to which we would refer the interested reader.

It is there shown that grass should be cut while a large share is yet in flower, and be cured in the shade—in the swath and cock—in order to secure its best nutritive qualities. It should neither be over-ripe nor over-cured, to form an article of winter fodder that will "spend well" and keep up the condition of the animals which consume it.

Meadows may be sometimes observed, in which no economy of fodder seems to have been thought of. A great deal of grass remains uncured—the fault generally of poor mowers, and a considerable share of that cut has been left in gathering, for want of better attention to raking. It is worth while this year, at least, to cut all our grass, and to rake clean what we have cut, and will cost but a trifle more in labor. A man who cannot learn to mow closely and evenly, should not be allowed to use the scythe, and the farmer who hurries so fast as to leave gaps enough unraked to pay another hand, should slack his unhurried rate of speed for one savoring of a better economy.

In stacking hay, large losses are often incurred by small stacks with a good deal of surface exposure, and by ill built stacks, which fail to secure the hay from the weather. For stacking, hay needs to be well cured; then, should heavy rains occur, the stack, if well built, will settle firmly, and the moisture on the outside will not combine with that within to spoil the hay before it can dry again. We have known instances in which this occurred—in which hay sufficiently dry for the barn became almost entirely spoiled by a driving rain falling upon the stack soon after its completion. Large stacks should be the rule for out-door storage, in all cases in which barn room cannot be given.

To hay of inferior quality it is well to add a sprinkling of salt occasionally, when mowing away, as it will increase its palatableness for stock, and the same "seasoning" should be given to all hay which we have reason to think insufficiently dry for storing. This furnishes one of the most convenient methods of supplying salt to stock during the winter season, and is very generally practiced by provident farmers. It is said that a mixture of salt and lime, sprinkled freely over hay, will enable one to store it away with less curing than would otherwise be safe, and that fodder treated in this manner is much liked by cattle, &c., and that the mixture promotes the health and thrift of all stock kept upon it. Of this we have had no personal experience.

Economy of fodder, every year, lends some farmers to cut the grass along the fences in their grain fields, and all out-of-the-way spots producing grass not otherwise brought into service. It is a good plan, not only on this account, but as destructive of many weeds

which otherwise soon give a "border-ruffian" appearance to our farms, and stock the whole neighborhood with troublesome occupants. We trust this matter will be attended to by every farmer, and with greater particularity this year than ever before.

No doubt the reader can see upon his own farm, chances for economizing in the matter of saving fodder beyond what we have pointed out. We hope no one will forget to finish up as he goes—not only cut all the grass he can, but cure it well and store it safely against the wants of the coming winter.

Attendance at Fairs.

As the season is rapidly approaching when our annual exhibitions of the various Agricultural Societies is to take place, it may be well to say a word or two upon it at this time.

A great many farmers and their families live so remote from places where exhibitions are to take place, that they can only attend one day out of the three or four devoted to the whole show, and to make the most of a brief time should be the prime object with all.

It is generally the case with those who attend fairs, that on coming into the grounds, they begin to "see what is to be seen" in the most imperfect and hurried manner possible. They pass through the several departments of horses, stock, implements, and in the tents of manufactured articles, with a rush; not stopping to look at anything a minute, but gazing at the whole with a hurried and superficial glance. So they pass from one point of interest to another, and at length they have jammed through the crowd and seen the whole! But what do they know of what they have seen, or what can they tell of a single article? Ask them, (after the Fair,) if they noticed such an object—a machine of curious and peculiar workmanship—and they will answer, "No." "Why you should have seen that," is the response; but in the bustle and crowd they hurried along—saw a good many things, but noticed nothing. The only thing connected with the exhibition which they remember, was, they saw a great many people, and were in a hurry and crowd all the time.

Now let us tell you how to see all that is really worthy of particular attention—even at the State Fair—in a brief space of time.

In the first place, settle the fact before starting, that all cannot be seen. To be better understood, if you were to give any degree of attention, or even note, to every article presented for exhibition, it would take you a whole month, and then perhaps it would not be accomplished. So we mean simply this: make up your mind to give attention to the really valuable and interesting objects, and pass by those which are ordinary or common-places. If you are interested in the department of cattle, pass by the good stock; but when you see something more than that—something extra, or having some remarkable features,—make a brief note of it and pass on. In this way go through all the departments—which can in this manner be accomplished in less time than one would suppose. Have a note-book, or a slip of paper, and where an article of greater importance presents itself, note it down. In this, you economize your time—have a better idea of the whole exhibition, and come away with much practical knowledge of the affair, and with a good idea of some interesting features, which were worthy of special attention, and not with a confused mass of objects, about which you know nothing.

The great object and chief end of our agricultural fairs, should not be lost sight of. They are indeed, the

farmer's holidays; they come at a season when the more severe and harder labors of the farm have been brought to a close—when the golden harvest has been gathered in, and it is fitting that the hard-working farmer, with his family, should indulge in that relaxation from toil, and in the pleasurable and instructive exercises which our farms afford. But let us repeat it again—make your attendance at the coming exhibitions of our agricultural societies, not only a recreation, but a means of improvement in the various branches of Rural and Domestic Husbandry. No better opportunity can possibly be had, if rightly improved and made use of. Do not therefore, go with only a thought of passing away the time, or of spending it in an indifferent manner; but go to think and study—to talk with your brother farmers, and to examine the stock, implements, and produce brought to the exhibition by them. Then will it be a useful attendance, and you will return home with a fuller determination to work, and to accomplish something greater than you have yet done, in this your most noble occupation.

Seeding Cornfields to Grass.

A correspondent of the *Rural New-Yorker*, gives his "experience in seeding one season," to the following purpose:—He planted eight acres of corn on land manured the fall previous, thirty loads to the acre—hills four feet apart, culture, level—hoed the last time the second week in July, and sowed on a peck to the acre of grass seed, husked early on the hill, and then turned the cows in. The green feed and stalks lasted until November, greatly increasing the quantity of milk and the flesh of the cows. The next spring he cut the standing stalks close to the ground, in one day, with a corn cutter. This piece yielded the largest crops, and continued to produce well the longest of any he ever seeded, out of over a hundred acres stocked down with oats and wheat in the spring. The locality should have been given, as well as the number of cows kept upon the field. The facts stated confirm what we have repeatedly urged—that "land in good heart" was much the most profitable for seeding to grass—and that it is folly to expect good meadows from fields "run" with grain as long as they will bear it before seeding.

Plowing in Green Crops.

J. L. B., who wishes information on this subject, is informed that the practice of plowing in green crops does not rest on theory merely. It has been adopted by many practical farmers to great benefit, as a part of an enriching course of rotation; and where a supply of stable manure could not be obtained, or where the distance to draw it, or steep hills, rendered its conveyance too expensive, green crops have proved a most economical auxiliary. We would not however, recommend it alone, but in connection with the application of more or less stable manure, with a proper quantity of lime, plaster, ashes, &c. The objection that it is not in accordance with the "intention of nature," who furnishes vegetables as the food of animals, and the excretions or remains of animals as again the food of plants, we think hardly tenable as an exclusive rule; for some of the finest natural soils are those on which a large quantity of vegetable growth has decayed and furnished enriching materials. We can improve this natural process, by first selecting such vegetables as are best for this purpose, and then promoting their rapid decay by mixing with moist earth, adding animal manure to improve the whole.

More about the Wheel on the Plow.

Messrs Editors—Noticing B's article on page 349, vol. 13, CO. GENT., induces me to communicate my ideas with regard to the utility of the wheel. I claim the wheel to be a decided advantage, and had B. asked me the use of the wheel, I should have given my reasons for its use as follows: To keep the plow in the ground, as well as out. By giving a moderate pressure on the wheel, your plow is not so liable to raise when the team, in going over a knoll, draw upon the end of the beam; to lessen the draught, in consequence of turning a furrow of uniform depth and width; to make easier work for the plowman, because it keeps the plow in place, and makes it do better work, especially with a raw hand to hold the plow. Set him to plowing green sward with the wheel on,

and without; then examine the work, and if that does not convince you of the use of the wheel, your plow and wheel must be different from mine. I have had considerable experience in plowing—with and without the wheel—and I can do better work with the wheel on the plow, "besides doing it very much easier."

My experience in holding the plow, differs from B's somewhat. In plowing without the wheel, I raise the handles to make the plow enter the ground, and lower them for the reverse. While using the wheel just reverse the above. In plowing over knolls press the handles gradually, to keep the plow down, and raise them as it goes over, which makes a furrow of nearly uniform depth, and prevents the plow running down to the beam through every knoll, and nearly setting your team.

In respect to the kind of wheel used, my opinion is that there is some kind that are worse than none, and probably that is the kind B. experimented with. I have seen but one kind that, in my opinion, will answer the purpose, and that is a wheel a foot or more in diameter, fastened to the landside of the beam, at the end. This kind of wheel answers my purpose admirably. A small wheel of six or eight inches in diameter, directly under the beam, is nothing but a nuisance. W. N. B. Jamestown, N. Y.

Buggy Peas, Hessian Fly, &c.

"Truth would you teach, or save a sinking land,
All fear, none aid you, and few understand."

Messrs. Editors—In your date of June 21, I noticed an article by "L. B." who thinks that I am incorrect in my statements respecting the "Hessian fly," "wheat midge," "smut insect," &c., and quotes the late Dr. Harris as his "mentor." Dr. Harris may have been a very good entomologist; but he certainly knew very little about the vitality of buggy peas, or the bugs with which he was acquainted were much better "taught by the prospective care of Providence," than those I have seen in this country. For instead of being "instinctively taught to spare the germs of the peas," ours almost universally use up the entire germ of the pea. I have several times, heretofore, had the vague and crude theories, hypotheses, and suppositions of those so called learned and "scientific" doctors, professors, and other old as well as modern writers, (who have generally copied from former authors who knew little about the subjects upon which they wrote as themselves), put in opposition to my facts. I stop not to refute their absurdities. It is sufficiently laborious, in the infirm state of my health and old age, for me to state my own views, derived from my knowledge of facts. But how a man can be so misled, even by learned doctors or others, as to believe that peas, without germs, will grow, I cannot imagine; and having oftentimes examined them, I know the fact that, at the least, nine-tenths (I believe I might truly have said *nineteen twentieths*) of the peas in this country which have bugs in them, have the germs destroyed.

It is much easier, in controverting an opponent, to quote from the so called "scientific writers" (though they are often times entirely incorrect,) and thus throw doubt upon his statements, than it is to ascertain the facts by long continued observation and research, as I have done in regard to some of the most troublesome insects which so frequently annoy us.

I am curious to learn how my friend L. B. knows that the "midge does not live over through the winter," (as we backwoods farmers say.) I did not know nor state that it did, but supposed it might probably be so, as I do know that the *Hessian fly*, the *mosquito*, and many, if not most of the other insects do so. I have seen and been bitten by mosquitos as early as the 15th of March, although no previous warm weather in which they could possibly have hatched out, had occurred since the preceding October. I correctly stated the facts about the Hessian fly, which I had previously hatched out, and knew; and would not "give a fly" for the opinions of a dozen Dr. Harris or Dr. Fitches about it. If L. B. would, he may take the trouble to do so. The insects are easily caught and examined.

If the "fly" is occupied several weeks in laying its eggs, it would seem to me to be very foolish in farmers to delay sowing their winter wheat until the 15th or 25th of September, under the impression that it would thereby escape the deposit of the insect. To show that the fly uses but a short time in which to make the deposit, I will state that I once sowed a field with wheat on the 28th of August, and another, on the opposite side of a farm lane, on the 1st of September. The first sown was so destroyed by the fly, that I did not get five bushels per acre. The later sown (only four days later) yielded twenty or more to the acre; both were "summer fallowed" and treated exactly alike. In that case, it would seem that there was a very abrupt termination of the labors of the fly, as none were to be found in the later sown field,

excepting a few within a rod or two of the fence next the first sown field, and the few probably got in it in the spring.

I have neither time, health, nor inclination to rewrite what I have published during the last twenty-five years, respecting my discovery of the cause of smut in wheat. To go again over that ground would be too great a labor; and I regret that I have no fair copy, or I would send one to my friend L. B. If he wishes to have a full history of the discovery, he can do so by procuring copies of the "Daily Albany Argus" of February, 1833, and of the "Genesee Farmer" (monthly) of March, April, May, June, July and September, 1850, which contain my own communications and those of others. My signature in the Argus was H.; in the Genesee Farmer it was "J. H. H."

Not having had a lens with which to examine the smut bug, in my first communications, I described it as being "ash colored." It appears so to the naked eye; but with a good pocket lens it is seen to be spotted with four large, and many small brownish spots. The copy of my communications was sadly misprinted in some instances; but my friend, L. B.'s intelligence will enable him to correct the reading. J. N. B. Seneca County, June, 1859.

Monthly Market Days vs. Fairs.

It is supposed that fairs (as distinguished from markets,) originated in the sordid disposition and cupidity of the monks, who, away back in the "middle ages" of English civilization, held out such exciting exhibitions and boisterous revelry, as fairs were long distinguished (by a sort of "bad eminence") for fostering and extending, to draw together large numbers of people, who paid a fixed toll to their monkish patrons and abettors, for the favor or folly of wasting their substance, often hardly earned, and indulging in more animal excitement, and the gratification of a prurient curiosity.

Modern fairs have frequently been distinguished by their concomitant encouragement of folly and knavery, if not more vicious and repulsive gambling and chicanery; hence, in the new movement now apparently inaugurating, and likely to extend, in favor of "periodic markets," it will be well to keep in view the distinctive difference between "markets" and "fairs," that the objections which have heretofore characterized the latter, may be obviated in securing the indubitable advantages of fixed times and places for selling, or periodical "marketing."

Fairs, as distinguished by their faults or objections, occur too infrequently in some parts of England, not often more than four times a year—in most districts perhaps only twice; with us only once a year, and not then unless there is "much excitement" as the *sine qua non*, without which they apparently cannot be "got up." The object of "markets" is to establish a regular and methodical system of preparation and sale of agricultural productions; but fairs are neither certain, regular, or orderly, but on the contrary are distinguished by extraordinary, spasmodic, and exhaustive preliminaries, and no less precarious and fluctuating results. Indeed, except as a mere stimulus of efforts to "display and astonish," it is very doubtful whether in their aggregate results, fairs have been productive of any extended and permanent good.

It must be stated that meetings for the exhibition and trial of agricultural implements and machinery, are not included in the scope of these remarks, which are intended to apply more particularly to meetings to promote the sale of stock, and general or miscellaneous produce of the garden and the farm.

In England that quarterly or semi-annual fairs were not only too infrequent, but that rough weather, or the necessity of attending to the business of the farm, often precluded attendance, and thus defeated the purpose of the fair, which was principally that of selling stock—the sale of produce being merely incidental. This led to the establishment of "monthly markets" throughout most of that country, and this increase of periodic stock and market sales, proved to be a great improvement, inasmuch as it gave an alternative opportunity and choice of time; fairs having given no choice as between selling this month or next, but if from any accidental or unavoidable cause the fair could not be attended, the vendor or seller was left to the incertitude of precarious private sale, or to "hunting up" a buyer. But the regular "monthly market" gave a choice of times and places. If A was too busy, or B was sick, or C's cattle were not quite ready this month, they could be kept a month longer; or if it was only needful to feed them a week or two instead of a month, this could be done, and the animals sent (sometimes a few miles further, in other instances not,) to the great market of an adjoining county; the

monthly markets being generally held on different weeks—as the first Monday in one, the second Tuesday in another, the third Monday in a third—in contiguous counties.

Such a system of periodical meetings, while being free from the spasmodic accessories, exciting scenes, and pernicious consequences of tumultuous and infrequent fairs, produces most satisfactory results by affording timely opportunity for deliberate discussions and comparison and sale of stock and other farm products, and at the same time allowing farmers to kill not only "two" but a score of birds with "one stone," to attend many other purchases and matters of business and inquiry without special journeys and the loss of time incidental thereto. Markets are held weekly for the sale of grain, meat, butter, poultry, pigs, &c., &c., and in the large towns twice a week in England. Perhaps monthly is often enough for cattle in the rural districts, but a regularly and frequently recurring market day will be found very advantageous in preventing forestallment, in affording choice of place, time and purchase, and above all in preventing or modifying the extreme fluctuation in prices, which frequently result in great losses to those able to bear them from their resources set about by greed, and only resulting in aggrandizing the unworthy. At another time I may attempt a brief description of the arrangements and methods of marketing produce, &c., in England, according to the best means of information at command, and also endeavor to show wherein the adoption of such or a similar system—modified as difference of circumstances and necessities dictate—would be vastly preferable to the bare of runners, the scrambling no system of the street, or the time-wasting and precarious resort of "hunting up" a market where you can find it, perhaps when needed—perhaps a day, a week or a month thereafter. MARKETER.

Advantages of Irrigation.

MESSRS. EDITORS—The following is translated from Dr. GIRARDIN and DU BREUIL, on irrigation:

Vegetation cannot put forth a rapid and vigorous growth unless constantly supplied with a certain amount of moisture from the soil, for this favors the process of germination, hastens the decomposition of manure, and serves to convey the elements which nourish the plant, to its roots; and finally, renders the soil so porous that the air and young roots can easily penetrate it.

The greatest drought occurs during the summer, and this time is the most dangerous, because then the plant has the greatest need of absorbing watery substances through the roots, in order to replace and supply the loss occasioned by the evaporation going on so rapidly in its leaves.

Wherever systematic irrigation has been for a long time practiced, the most abundant crops produced in the nature of the soil—indeed the appearance and productivity of a whole region of country, is observed to be changed.

All waters, even the purest, deposit, especially during heavy rains, a portion of costly manures, as lime or mud, and retain certain soluble salts in solution, as magnesia, lime, gypsum, potash, &c., which, during irrigation are transferred to the soil, whose properties are by these means improved. In addition to the substances already introduced, come the gases—carbonic acid and ammonia, which, combining with the former, represent all the elements necessary for a vigorous growth of vegetation; and therefore it is evident that all of the effects produced by manure may be replaced by irrigation.

Concerning its importance, Bousingault very correctly said, particularly in reference to meadows—"if a field is not of itself rich enough to render a copious supply of manure unnecessary, it can never be profitably cultivated for a great length of time unless in connection with a meadow." Or, in a word, and on the previous supposition that the soil does not possess a sufficient quantity of inorganic substances to supply directly, without the use of manure, the alkaline and earthy salts to the soil, which have become exhausted through continued cultivation, something must be expended every year in replacing the elements carried off by the previous crop. For this reason are lands flowed and enriched by streams, the only ones which allow of a continual exportation of their products without suffering deterioration.

To such belongs the valley of the Nile, and it would be difficult to form an idea of the immense quantity of phosphoric acid, magnesia and potash annually carried off of Egypt in grain.

Irrigation is without doubt the most simple and economical means of increasing the fertility of a field conveniently situated, because it affords fodder in abundance, and in consequence a good supply of manure. The mineral and organic substances which the water often contains in such minute quantities as to escape entirely analysis, are discovered by the plant and taken into its organism, just as they absorb those gaseous elements which are diffused in the atmosphere

in a quantity not exceeding a few ten thousandths, at the same time transforming and condensing them.

In this manner the plant gathers to itself and gives a new form to those substances, which, being dissolved in water, are diffused through the soil and air in order to facilitate their reception and appropriation by animals.

Nothing further is necessary to explain the advantages of irrigation; but to derive the most profit from it certain conditions must be fulfilled, which at some future time we will endeavor to illustrate.

I send the above as an introduction to a few articles on irrigation. S. K. SMITH. Stockholm Depot.

The Thousand-Legged Worm.

MESSRS. LUTHER TUCKER & SON—Enclosed please find a sample of a small worm that has taken possession of my garden for the last three years, almost totally destroying everything of vegetable kind. In the winter season they disappear or go deep in the ground, and early in the spring commences on the winter roots, &c., and devour them until the young vegetables commence to grow, when they attack them and completely destroy all but some of the most hardy, which seldom get to perfection. The large strawberry, when near ripe, will often contain as much as fifty of them. They will make a small hole to enter, and devour the heart from the fruit, and so long as there is room for a worm they will go in. The young cucumber, radish, beans, onions, &c., all fall a prey to them. I call them wire worm, but not knowing them, I am uncertain whether correct or not; and as there are no others in the vicinity, I would like to know what they are, or if anything can be got to destroy them. I have tried lime, ashes, &c., but without success. The only way I can find to destroy them is, when the weather is warm, to boards round the walk in the evening, when early in the morning they will be under the boards by thousands—then I apply boiling water.

Please say to THE CULTIVATOR, if there is any known name for them, and anything that will destroy them. JAMES ADAMS. Armstrong Co, Pa.

Answer to the above by Dr. Fitch.

MESSRS. TUCKER & SON—The worms from Mr. ADAMS, are a centipede or "thousand-legged worm," pertaining to the genus *Julus*, in the *Apterous* or *Winged* order of *Centipeds*. Unlike the great mass of insects, these undergo no transformations, but always remain in the worm-like shape in which they hatch from the eggs. And whether these specimens are the young of one of our larger species, or a minute species now in its mature state, I am unable to say, having never yet carefully investigated the group.

One of the latest and best authorities respecting them says, "*ces sont des animaux inoffensifs*"—these are harmless animals. They are most fond of dark, damp situations; hence Mr. Adams finds them congregated under boards lying on the ground. Scarcely a bucket of water has been drawn from my well, this present season, that did not have one or two of these worms in it. Crawling from their retreats in the crevices of the stones of the well, they lose their foothold and drop into the water, the coldness of which renders them torpid and unable to crawl out. I must procure a trout and place it in my well to keep the water cleansed of these worms. Though should one of them chance to be swallowed in drinking, I doubt not the gastric juice would destroy and digest it. This, however, is an experiment in dietetics which I do not care about trying.

As to the food of these worms, it is no doubt vegetable substances which are in a diseased and decaying state. It is in old rotten logs in the woods that we always meet with our largest species named *Julus americanus* by Beauvois, and *marginatus* by Say, which is three and a half inches long, and over a quarter of an inch thick, of a lurid, grayish, olive color, with a red ring to each segment of its body, and usually just one hundred pairs of feet. And these small centipeds in our gardens and yards appear to be most numerous where decaying vegetable substances abound. Where a radish has been bored by the larva of the radish fly, where a cabbage root is clumpy or otherwise diseased, I have noticed these worms crowded together upon the affected spot, evidently to feed on the particles of semiputrid matter they there find, and very probably promoting and extending the disease by removing this decaying matter, and thus exposing a fresh surface to the action of the atmosphere. And I presume the strawberries, cucumbers, &c., mentioned by Mr. Adams, were in the first instance wounded by ants or other insects, and were thereby rendered attractive to these centipeds. Several years since, a physician of this town, now deceased, from finding these worms very numerous in decaying potatoes, and unaware that they occurred abundantly on all other decaying roots, at once jumped to the conclusion that they were

the veritable cause of the potato disease, and in the excitement at that time prevailing, his communications to the press on this subject attracted a somewhat wide notice. But everything known of these worms, impresses me with the belief that they never attack living, healthy vegetation, and consequently do not cause disease, though they may aggravate and extend it where it is already commenced. ASA FITCH. Salem, N. Y.

Lime vs. Guano.

MESSRS. TUCKER & SON—Residing in a section of country where lime does not enter into the composition of the soil as one of its inorganic constituents, and where there is becoming of late something of a commerce in guano, the facts very naturally elicit the question whether the extra crops produced in using it ever pay for the article; and whether, if the same amount of capital, being invested in time and used, will not produce results as good, and be more permanent and lasting in its effects upon the soil in subsequent years?

These questions I conceive to be of interest, and of especial importance to young farmers, who, having but little means with which to experiment, are anxious at once to bring their lands into a higher condition at the least possible expense.

In soliciting through the medium of your papers, the views of those who have had experience in these things, I am aware that it may be said that much will depend upon the prices of these commodities here, the facilities of transportation, &c.; and in order that more correct opinions may be formed, will briefly say that we are situated at the western terminus of the Delaware and Hudson Canal, and 14 miles from the Narrowsburgh depot of the New York and Erie Railroad. The nearest limestone quarry to this point is 50 miles distant, near the canal, in Sullivan county, N. Y., and from which place the lime is burned and delivered here for ninety-five cents per barrel. Will it remunerate us to pay this price for its use as a stimulant to our soils, or at what price should our farmers obtain it for this purpose? C. G. REED. Bethany, Pa.

Proper Depth for Covering Seed.

EDS. COUNTRY GENTLEMAN—In your issue of May 5, you have an article upon "Proper Depth for Covering Grass Seeds," upon which subject allow me to say a few words, though a mere tyro in grass culture, yet some experience in the matter.

How are the seed of grass and weeds sown in the mighty prairies of the great west, on the millions of acres owned by Uncle Sam—plowed in, harrowed in, rolled in, land plowed, or left as nature made it, and the seed sown by the hand of their Creator? In portions of the boundless west, where rain falls but seldom, how do those grasses stand drought?

The corn, hickory nut, seeds of the forest? Take a cane break, cut down, leave to dry, trim it off and see the countless millions of coke, iron, hay weeds sown by birds and wind.

Why then labor to cover grass seed? Will not the first good storm, not to say rain, cover deep enough for every mature seed to vegetate? I have failed in securing a patch of grass and clover, and from the lightness of soil. I would now prefer, after plowing and perfect harrowing, to roll land first and compress the surface, then sow my seed.

I have sown oats and rye, even on land after corn, and was laid by, and made good crops. Have done so by the 50 acres, and if land be laid level, prefer it. A friend was induced to test this by plowing 100 acres and sowing on surface another 100 acres; the latter was the best crop.

We are too prone to kick nature out of our councils and "go it alone," "on our own hook." Why stir, sow grass seeds, plant corn or cotton from surface to any depth it will grow out, and on some land roots will invariably grow to some depth. I defy you or any man to make corn send out roots four to six inches deep, then grow and none to be sent out above. Place corn four to six inches deep, and the roots that then spring forth only grow until the bulk is formed, any one inch below the level, and new roots put forth. In reality it is loss of power and loss of time. Corn is only a grass, so with it, why not with Herds or Blue grass?

Years ago I bought 100 bushels of oats, divided with an old planter, he sowed and covered with a plow, I sowed and ran a light brush over; both crops of land were well plowed. I had a full and perfect stand, he complained that I had sown oats, and his were more than half spoiled.

I said, "you covered too deep," the oats were from the same field, and impossible there could be a difference. He never plowed any more oats in. I never cover seed deeper than to exclude light and protect from enemies, and save so dry a year as this, I have perfect success. M. Mississippi.

RAVAGES OF INSECTS ON FOREST AND FRUIT TREES—REMEDY.

The trees in the parks and gardens of this city having been seriously affected by insects, we sent to Dr. Fitch some of the limbs affected; and the annexed answer gives the remedy for these depredators. J.

JUNE 27/1860.

Hon. B. P. JOHNSON:

DEAR SIR—The “depredator upon the trees in Albany—very extensive”—of which you send me specimens—is a species of scale insect. The oval brown scale is the dried remains of the body of the female, which, adhering to the bark, covers and protects her eggs during the winter. When the warmth of the advancing season is about hatching the eggs, a white cotton-like substance begins to grow among them underneath the scale and protrude from one of its ends, elevating it from the bark—this cotton serving to protect the tender young insects till they become sufficiently robust to endure a full exposure to the atmosphere. The newly hatched insects resemble exceedingly minute lice. Each of these little masses of white cotton which are adhering along the under sides (as I suppose) of the limbs, may now be seen, by the aid of a magnifying glass, to be thronged with these lice, or with eggs not yet hatched. After a while, the lice will forsake this covering and disperse themselves over the bark—particularly the smooth tender bark of the small limbs and twigs—nourishing themselves by puncturing it and sucking the sap therefrom.

All kinds of these scale insects are most pernicious to the trees or other vegetation on which they occur. The apple tree bark louse—the minute oyster shaped scale, so common on our apple trees—is the species with which we have had the most experience; and it is altogether probable that any remedy which is effectual for it, will be equally efficacious for all other scale insects, including this now on the Albany trees. In the Memoirs of the old Board of Agriculture of our State, vol. iii, pages 535–539, is copied from the Memoirs of the Caledonia Horticultural Society, an article by Sir G. S. Mackenzie, on anointing the bark of trees with oil, to destroy insects thereon, alluding particularly to the apple tree bark louse. And in Illinois and Wisconsin, where of late years this insect has been unprecedentedly fatal to their orchards, and where every remedy which could be thought of has been tried, with but indifferent if any success, it is now reported that smearing the bark with oil—the same measure so long ago noticed by Mr. Mackenzie—has been found to be a sovereign cure for this malady. I doubt not but that by it, many of your Albany trees may be saved, which will otherwise perish. Fish oil, or any other kind of oil or grease, thinly applied, everywhere over the bark, so that its glossiness, is merely perceptible, is all that is required.

Messrs. Ellwanger & Barry have also sent me specimens of this same insect, as being abundant upon the maples, especially the soft maples, at Rochester. It is, therefore, very common at this time, probably, over a large portion of our State. In former years, I have occasionally met with single specimens of this scale on the trees here, in Washington county. An insect of this same kind occurs upon the maple in Europe, and is named *Lecanium Aceris* by entomologists. The fullest account of this insect which I have seen is in Curtis's British Entomology, where it is stated that “a white flowery-like matter, in which the minute young are to be observed,” grows underneath the scales. As it is a fibrous cotton-like matter, not at all pulverulent like flour which our insect grows, I think it is a distinct species from that of Europe, and have, therefore, named it in my manuscripts, *Lecanium Acericorticis*, i. e. the maple bark scale insect.

Yours truly,

ASA FITCH.

ing into a yard of its own breadth (20 feet) and 50 feet deep—the other barn adjoining, 40 feet by 75, including a central floor of 35 feet, beneath which the basement is to be occupied as a hospital for lambing ewes, and a bay on either side 20 feet in width and open down to the ground. The width of the floor is such that two loads can come in abreast if desired; and an immense quantity of grain may be thrashed here without inconvenience, the thrashing machine employed carrying out its own straw into the yard, where it is stacked at 15 or 20 feet distance from the barn. This Cattle-yard has a third grain and hay barn on the opposite side, with stables beneath for the farm horses, and is enclosed with walls for the remainder of this and the other two sides.

The basement of the two barns described is eight or nine feet high—the smaller of them 16 foot and the larger 20 foot posts above the basements. The racks mentioned, in which the fodder is dropped down to the sheep through openings in the floor above, are composed of slats too near together (2 or 2½ inch spaces) for the sheep to thrust their heads into the hay far enough for the seeds to get into their wool. Mr. Geddes finds the arrangement of the sheep-barn work so exceedingly well in practice, that he thinks it can scarcely be rivalled, and for convenience, tidiness and apparent excellence in all other respects, the writer certainly has never seen its superior.

These notes are too extended for more than a word with regard to the sheep themselves, which are of Merino descent, with a Saxon fineness of wool readily commanding 50 cents a pound; they are of good size, having long been bred with a view both to this object and to fineness of the wool, which is not laden down with grease although by no means dry—although a flock which no lover of the Fine-Wools could pass by without notes of most sincere and earnest admiration. Even one who must confess to a bias for the Downs and Leicesters—in these times of low mutton markets—cannot help appreciating merit of another sort; and as to mutton even, Mr. G. is going to convert us, hereafter, to the Merino faith, when one of those wethers is properly ready for the knife.

The farm, we should add, has been for some time back carried on by Mr. JAMES GEDDES, who has his father's encouragement and advice in every improvement he undertakes; and we believe that the two gentlemen have been plotting together with a view eventually of making their 300 acres support 500 sheep, yield still larger grain crops, and continue to improve in fertility several per cent. each year at the same time. Our space has allowed us barely to present a skeleton of their system of management—to which we deem it scarcely necessary to add that, neither from his own experience, nor from that of other good farmers around him, is Mr. G. led to express the most remote doubt with regard to "the profits of farming" if set about in the right spirit.

"H. H. D." among the DEVONS.—The Mark Lane Express chronicler of "the Herds of Great Britain," has at last gone down into "the land of apple orchards, shady lanes, junks and syllabubs," and found for the first time in his life a dish of clotted cream flanking his maternal eggs and muffin. He feels himself "well out of the Booth, Bates and Townley jurisdiction," and with hearty good will does "suit and service to the Red and All Red dynasty." Its "wide, full loin, neat fore-quarter, juicy steak-cut, small bone, and absence of coarse beef, along with that winding horn and bright deer-like eye," which "had not failed to strike the late Earl of Leicester, when he visited Davy's, Quarterly's, and Merson's herds, in his 'searches after truth and beef,' have carried the Devons into many other counties of England, as well as "among the turnips and partridges of Norfolk"—into France and Australia, as well as to "the New World, where," as we are told, "yokes of them form such a pleasant feature in the great States Cattle Shows." And "the numbers exhibited both at the Royal and Smithfield are annually on the increase; and last Christmas tide, the Short-Horn" were only in a majority of five over "the juicy red line." Nevertheless, it is added, "their lack of size by the side of the Short-Horn and Hereford, has created a prejudice against them, which their hardy qualities and their cream and beef talents have not enabled them to overcome. North of the Trent the Durham holds its own, and the Hereford is the favorite 'beef machine' of the Midland counties."

TIME OF SOWING TIMOTHY.—A writer on this subject in the Ohio Farmer, would sow early very early in the spring, or as late as October in the fall, to escape the effect of dry weather occurring before the plants come up, or while they are very small. He gives an account of two pieces sown last year, one after wheat, the ground being plowed the middle of August, and harrowed and sowed to timothy seed the 1st of September, after a smart shower. The other was corn ground, harrowed between the shocks of corn the 1st of October and sown immediately. It came up, and could be seen forty rods distance before winter. The first sown showed no signs of growth, and was again harrowed and re-sown the middle of October, and has since done well. Land for spring sowing, he thinks should be fitted in the fall, then by sowing early, the frosts will bury the seed in the best manner.

THICK AND THIN SEEDING.—In commenting upon some remarks recently given in the COUNTRY GENTLEMAN in reply to an inquiry, in which the advice given was "generally, but not always, to sow the most seed on rich land,"—the editor of the Genesee Farmer quotes English authorities recommending the reverse; "but," adds he, "the climate of Great Britain is so different from ours that we are not safe in adopting practices based solely on English experience. As a rule, the English farmers sow much thicker than we do; what would be called thin seeding there would be considered thick seeding here. The reason for this difference is probably owing to the fact that we sow wheat in the fall a month earlier than the English—and it is well known that the later wheat is sown the more seed is required. Again, they sow their spring crops at least a month earlier than we do, while the ground is cold and sluggish, and for this reason more seed is desirable than with us.

"There is one consideration connected with this subject which must not be overlooked. It is of the very greatest importance. *Thin seeding has a tendency to retard the period of ripening.* So that though, as we said before, rich land needs less seed than poor land, yet it is safer to sow wheat rather thick on rich land, in order to avoid late ripening and its attendant evils of mildew and mildew."

DEATH OF M. T. GOLDSBOROUGH.—The American Farmer announces the sudden death of this estimable gentleman, of congestion of the brain, at his residence near Easton, Md., on the 10th of March. "Mr. Goldsborough was well known within and beyond the limits of the State, as one of our most intelligent, and at the same time practical and successful farmers. As President of the Talbot County Agricultural Society and Vice-President of the State Society, he has been for many years prominently connected with the various measures pertaining to the improvement of our agriculture."

AGRICULTURE IN UTAH.—We have received a letter from the Secretary of the "San Pete Agricultural and Manufacturing Society," dated North Bend, San Pete Co., Utah, Feb. 8, 1861—from which it appears that an active association has been formed for the advancement of the agriculture of that district of country, and that a Fair was to be held by them in October next. Mr. SILER also encloses the following "preamble and resolutions passed by the A. & M. Convention for this county, which was held at Moroni on the 25th and 26th of Dec., 1860."

Whereas it becomes the duty of every one interested in agricultural pursuits to not only till the earth, but to store the mind with useful information in regard to the subject, and whereas Andrew L. Siler, Esq., Secretary of the San Pete Agricultural and Manufacturing Society for this county, has laid before the Convention the following works, the "Country Gentleman," "Cultivator," and "Annual Register," published by Luther Tucker & Son, Albany, N. Y., also the "American Agriculturist," published by Orange Judd, A. M., New York City—which we have carefully examined—therefore be it

Resolved—That we do earnestly recommend to the farmers of this county to subscribe for the above named papers, which we deem worthy of the patronage of every person engaged in the great work of agriculture and home manufacture.

Resolved—That we will use our best endeavors to extend the circulation of said works.

Resolved—That this preamble and resolutions be forwarded to the Country Gentleman and American Agriculturist by the Secretary of the San Pete A. & M. Soc., with a request that they publish the same.

ANDREW L. SILER, Sec'y.

UNION (MR.) AG. AND HORT. SOCIETY.—The following is a list of Officers elected at the Annual Meeting held at Patten, March 9th:

President—IVORY B. GERRY, N. 3. (Range 1.) Golden Ridge.
Vice Presidents—E. G. Nelson, Alfred Cushman, E. Forbes.
Trustees—Jacob Saunders, B. H. Chesley, L. Blake, Patten—James Brown, No. 5, R. 6—A. Cushman, No. 3—J. Hall, Patten—S. L. Kimball, No. 6, R. 6.
Recording Secretary—Samuel Darling, Patten.
Corresponding Secretary—S. Robinson, No. 3, R. 5.
Treasurer and Collector—H. N. Darling, Patten.

VERMILION CO., ILL.—The following are the Board of Managers, and post-office address, of the Vermilion Co. Ag. and Mech. Association:

President—Col. JOHN GERARD, Georgetown.
Vice-President—A. M. C. Haves, Georgetown.
Recording Secretary—Lemuel Cross, Jacksonville.
Corresponding Secretary—James Thompson, Catlin.
Treasurer—J. H. Gass, Catlin.
Directors—Harvey Sandusky, Jr., Catlin; D. S. T. Jack, Catlin; J. C. Smith, Ridge Farm; Col. Jesse Baldwin, Georgetown; John Macomber, Pilot; J. M. Dougherty, Salina; Francis Gaines, Dallas; William Sandusky, Dallas; James Sconce, Dallas.

A FINE COLT.—I have a colt which stood, at nine months old, 14½ hands high, and measured around the arm 19 inches. He is in excellent proportions throughout. Sired by Bay State—grand sire, Green Mountain of Vt. Dam bred in Kentucky. C. G. TAYLOR. Rock Island Co., Ill.

GRAIN PRODUCT OF AN ILLINOIS SCHOOL DISTRICT.—A correspondent of the Prairie Farmer gives the following statistics of the grain grown last year in a single school district in Lee Co., Illinois, as gathered by the teacher. District No. 3, four miles south-east of the city of Dixon, contains 24 families, and an area of less than two by three miles. Number of bushels of wheat, 24, 692; corn 41,428; oats 12,586; barley 1,947; rye 583; buckwheat 483; clover seed 182; potatoes 2,984.

[For the Country Gentleman and Cultivator.]

KENTUCKY BLUE GRASS—Poa Compressa.

L. TUCKER & SON—Observing in the last issue of COUNTRY GENT., a short article with above heading, in which the writer speaks of purchasing some of it from me, I write to correct an unintentional error in the botanical name, which may lead to confusion, with persons unacquainted with the grass.

I have never kept in my seed warehouse, or sold *Poa compressa*, but the real Kentucky blue grass, *Poa pratensis*, or green grass as we call it in this section. This is a very valuable grass, and by its abundance of radical leaf, forming the basis of our best mixture for the lawn or grass plot, but it is also very nutritious and highly relished by stock. Muhlenburg used to style it "optimum pabulum," the most valuable of all grasses.

The natural growth and abundance of this grass in some sections near Philadelphia, especially Chester county, where it starts spontaneously on clearing off the timber, has given a character to Philadelphia beef and Philadelphia butter, as unsurpassed elsewhere. As the writer remarks, it makes an early and late pasturage, and keeps green till Christmas.

Poa compressa is occasionally found growing here, but so far as my knowledge extends, is never sown. It yields but a small amount of herbage compared with the other. Our farmers object to it on account of the difficulty of getting rid of it. The rhizomes or creeping roots are very tenacious of life, and increase and hold on, almost approaching in this respect, a Canada thistle.

PASCHALL MORRIS, 1120 Market-st. Philadelphia.

[For the Country Gentleman and Cultivator.]

Varieties of Spring Wheat—Time to Sow.

MESSRS. EDS.—In the Co. GENT. of March 21, your correspondent, JOHN R. PRINCE, makes inquiry in regard to the best time to sow spring wheat to escape the midge, and adds his experience with the same. In answer, I would say that to escape the depredations of the wheat midge, more depends upon the variety of wheat sown, than upon the time of sowing. The Canada Club is an early variety, and cannot be safely sown in midge infected regions. I have known several attempts at growing this variety of spring wheat heretofore, where it was so destroyed by the midge as not to be worth harvesting, and was left uncult. The Fife wheat is a later variety, and generally escapes the midge, but is often considerably shrunken from rust or other cause. The "China Tea," (spring wheat) is a late variety, and unless sown very early, will continue to grow so late, that before the formation of the grain, the midge will have had their "day," and gone for the season. It is generally sown from the middle of April to the 10th of May, but good crops have been grown here both earlier and later than that. It is a "rank grower," and for its many other good qualities has nearly superseded all other varieties, at least in this locality.

East Shelby, Orleans Co., N. Y.

I. I.

"Our Garners are Full."

The great size and the number of the grain warehouses in Chicago are the wonder of all visitors. And yet vast as they are—two of them affording room for 700,000 bushels—there is not storage in the city for another week's receipts. Vessels and propellers are in request for loading in order to make room for what is arriving. As we are receiving from sixty to a hundred thousand bushels daily it is plain that unless navigation opens within two or three weeks our railway managers will be obliged to send promissory orders to the country to stop shipments.

Our tables published a week ago show that we have now in the city at least 4,300,000 bushels of grain. The amount is probably greater by the receipts of last week. Of this we have 1,550,000 bushels of wheat and 1,600,000 bushels of corn. Taking the mountain store, "by ciphering" some very curious results will be reached. Allowing 60 bushels to the load, nearly double what the farmer's team hauls, and it would take 71,666 teams to draw it; and if each team occupy 20 feet, it would take 365 miles of road to give standing room. This is exactly the distance between Chicago and Cairo. And again, it would require 287 vessels and propellers to clear out our storehouses if each one take a load of 15,000 bushels. And yet all we have in store is not a tithe of what our farmers will send forward during the season if satisfactory prices are realized.—Chicago Tribune and Press.

PROFIT OF SHEEP.—Paoli Lathrop, Esq., of South Hadley, Mass., stated at a recent Agricultural discussion, as reported in the Boston Cultivator, that without regard to any profit from the wool, a pound of mutton could be made cheaper than a pound of beef, adding that "in fattening sheep, one great advantage was, they could take their grain in a crude state and would thoroughly digest it, whereas the grain for cattle had to be ground, and a sixteenth part paid for that operation. He thought the English mutton breeds of sheep most profitable. His preference was for the South-Downs. They fatten easily, and their meat is very fine. It is with sheep as with cattle—the large breeds are most profitable on rich land, and the small breeds are best fitted for poor lands."

The Entomologist.

[For the Country Gentleman and Cultivator.]
No. 28—THE WHEAT MIDGE.

In an address which I delivered at the recent Annual Meeting of our State Agricultural Society, I spoke of some of our most important injurious insects as having been remarkably diminished or wholly extinct the past summer. I regard a portion of the information given in this address, particularly that relating to the wheat midge, as of such a character that it merits to be widely disseminated among our farmers before the opening of the coming season. I therefore communicate it, with some alterations and additions, for insertion in the COUNTRY GENTLEMAN.

It is now about thirty years since the wheat midge first invaded our State. During all that period it has been one of the most formidable enemies with which our agriculturists have had to contend—greatly injuring, and in some instances totally destroying their fields of wheat. Though its depredations have been much greater some years than others, almost every year it has been so numerous as to materially diminish the productiveness of this crop.

The habits and transformations of this insect I will briefly state, as some of our readers may not be familiar therewith. The larvæ, or little yellow worms, which occur in the ears of wheat are so universally known that it is unnecessary to describe them. These worms get their growth about the time the wheat ripens; and when a cloudy, damp day occurs, and the straw is wet with rain, whereby they can adhere to it, they come out of the wheat heads and crawl down the straw to the ground. Some make this descent before the grain is cut, others when it is standing in stocks in the field, and others which are belated in their growth are carried with the grain into the barn. On reaching the ground they crawl slightly into it, or under any decaying leaves or straws which they find on its surface, and there remain at rest during the autumn, winter and spring. The warmth of this last named season changes it to a pupa, in which state the worm appears as though it had a kind of vest or hood drawn over the head end of its body, with some little cords hanging down in front.

From this pupa the perfect insect or midge comes out in June. This resembles a minute fly or musquito. The reader will form a very good idea of its size, color and appearance by imagining one of the little bright yellow worms which he has seen in the wheat heads, with long and very slender legs and a pair of small wings attached to it. There are two species of these flies found together in our wheatfields. One (*Cecidomyia Tritici*, Kirby) has the wings perfectly clear and glossy. The other (which I have named *Cecidomyia cerealis*), which is more rare, has seven dusky spots on each of its wings. But as we know of no dissimilarity in their habits, this distinction is unnecessary, except where scientific accuracy is required.

Most of these flies are hatched, each summer, in fields where wheat was grown the year before. They remain at rest during the daytime, and become active in the evening. Immediately after they are hatched they are flying about everywhere in search of the fields in which the new crop of wheat is growing. In these fields they all gather themselves in the course of a few evenings, and there remain. They repose during the daytime, standing upon the wheat stalks down near the ground. After sunset they take wing and hover in swarms around the heads of the wheat. The females will now be seen dancing up and down these heads, intently occupied in selecting a place thereon which is suited to their wants. Such a spot being discovered she alights upon it and pierces through the chaff with her sting or ovipositor. This is a hollow tube like a very fine hair, which she protrudes from her body. Through this she passes her eggs, one after another, into the chaff, placing them in contact with the germ or young kernel of grain. When this act is completed the labor of her life is finished, and she soon dies. Sometimes she is so exhausted by this work that she is unable to withdraw her sting from the chaff, and perishes, hanging thus chained thereto.

Long ago I found that these flies began to appear in the wheatfields on the 15th of June, and that they became excessively numerous there, in the course of a day or two afterwards. Yet I knew not but that they might have been hatched one or two weeks before that time, occupying the first period of their maturity in selecting and pairing with their mates, and only resorting to the wheat when they were ready to deposit their eggs and die. How to ascertain when this insect is first disclosed from its pupa, and how long it is occupied in migrating from the old to the new wheatfields is a problem which has been often in my thoughts, without being able to devise any convenient mode for its solution. Last season, however, it occurred to me that as these flies are attracted into our dwellings by the lights therein, it might hereby be found when they first begin to appear abroad and how long they continue. Accordingly, employing my evenings in reading beside an

Open window, it was on the 13th of June that one of these flies was first seen to alight on the paper before me. Upon the two following evenings quite a number of them were noticed, after which they were seen no more. It hence appears that two or three evenings suffice them for finding their way from the old into the new wheat fields.

It may here be remarked that among the hosts of midges, flies, and other small insects, which enter our windows upon warm sultry evenings, and are so great an annoyance around our lamps, the wheat midge is readily recognized by the bright yellow color of its body. None of our other minute flies which occur in the same situation are of a similar color.

The wheat midge, it is probable, varies somewhat in the time of its appearance, as the season is more backward or forward in different years, for the same atmospheric influences which hasten or delay the advance of vegetation operate similarly and to an equal degree upon the insect tribes, causing each species to come forth at the exact period when its food has grown to be in readiness for its use. And to the south of us, in Pennsylvania, the midge no doubt makes its appearance some days earlier than it does in this vicinity. Hence it is desirable that we have some other indication besides the mere date of a particular locality, by which we may be aware of the time when this insect comes abroad to commence its annual career. And it may therefore be observed that when the first solitary fire-flies are seen sparkling in the evening air, and when the white flowers upon our locust trees are beginning to fade, so that some of them are dropped to the ground beneath the trees, we may be aware that the wheat midge is then newly hatched and is beginning to gather in the wheat fields.

Note.—I perceive that to complete this subject will extend the present article to a length inconvenient for insertion, and I therefore defer my observations upon the disappearance of this insect to another number.

Salem, N. Y., March 11, 1861.

ASA FITCH.

The Dairy Department.

Bad Milk and Butter in Winter.

It is said that when cows are allowed to eat the litter which is thrown out of horse stables, impregnated as it is with liquid manure, their milk and butter will be tainted with the taste, in the same way that the flavor is injured by eating turnips, but to a more disagreeable degree. If litter is allowed to be eaten, it should be only given to other cattle, and not to milk cows, which should have nothing but the sweetest and purest food.

[For the Country Gentleman and Cultivator.]

"CHESTER COUNTY BUTTER."

The best butter in this country is admitted by connoisseurs to be made in the dairies of Chester and Delaware counties in Pennsylvania, from meadows a hundred years in grass, and which the owners never think of plowing up. The sod is said to be a foot thick, and consequently little affected by drouth. This butter is appropriated by the markets of Philadelphia, Baltimore and Washington, and a person once accustomed to its aroma and flavor, becomes fastidious for life in that article.

The dairy-people work their butter with a damp cloth, upon a marble or hardwood slab, (instead of a bowl and ladle,)—rinsing and wringing the cloth in cold water as often as it becomes saturated with the milk. The butter will not become waxy or salvy by this process, as it is made perfectly dry, with half the manipulation. A single trial will convince of this. Of course the butter must be salted and cooled, and time allowed for the salt to be entirely dissolved, before it is worked for packing, or for the table. The cloth must be close in texture, and not at all lumpy—a lump of ice will prevent the butter becoming oily in very warm weather. An ounce and a half will be found about the right quantity of salt for a pound of butter by this process, as the cloth extracts more salt than the ladle.

Mansfield, Pa.

S. E. M.

[For the Country Gentleman and Cultivator.]

INQUIRIES ABOUT CHEESE-MAKING.

EDITORS OF CO. GENT.—I have read with much interest, the articles on Cheese, by your correspondent D., Oneida Co. As my aim is to make a good cheese, and as my experience is limited, I am dependant on the experience of others.

1st. As to capping—will a rich cheese keep its shape without a band around it?

2d. As to scalding, he says, be sure and have the curd thoroughly cooked. How can I tell when it is so?

3d. Cook or scald to 100° to 110°, according to the weather. Does it mean that the curd should be scalded the highest in very hot weather?

4th. As to pressing—I have been taught that to press too hard at first would injure the cheese.

5th. How long ought cheese to be in the press?

And now let me say one word in favor of the COUNTRY GENTLEMAN. I see four other Agricultural papers, and I prefer the Co. Gent. to the allm. Your paper seems to be full of practical every-day matter—not a child's paper, full of puzzles or stories; and as I know that farmers as a class, do want a paper that calls itself Agricultural, to come to them with practical information in regard to business, I take the pains to say a good word for my favorite.

Lyme, Ct.

M. T. C.

Rural Improvement.

[For the Country Gentleman and Cultivator.]

LANDSCAPE ENGINEERING—17th Article.

Repairing Highways.

It must be apparent to any intelligent mind, that the whole system of management connected with the construction and repairs of the common roads of this country is very defective, and that it would be an easy matter to devise a plan that should be free from some or even all of its many objections. In the first settlement of a new country, we may be compelled to recognize the principle of a labor tax to develop those public improvements which are positively necessary, but as in the progress of civilization, each one assumes his separate calling, and capital is easily controlled, it would seem necessary by every course of reasoning, that road-making and repairing should become an independent pursuit, requiring thorough qualifications, and paid for by a money tax. It seems quite absurd that so difficult a branch of civil engineering should be controlled and directed by those who know nothing, either theoretically or practically, of the principles. Road-making, and whose forces consist of representatives of nearly all the trades and professions, the farmer, the cooper, blacksmith, physician, tavern keeper, bar-room loafer, &c., &c., meet alike on a common level on the common road, and however excellent or inefficient each may be in his own pursuit, the law presumes that nature has stepped aside from her customary plans, and generously bestowed upon each a full knowledge of road-making, and regardless of capacity or intellect, repeated herself in a manner no where else to be met with. It cannot be supposed that a road-master is appointed from any superior attainments in that science, as all know that merit is not a condition of success. To know how to read and write, is by no means essential, his duties being not so much in planning and directing work, as in keeping account of the tax worked out. Probably there cannot be found elsewhere so much concentrated ignorance, on the subject of road-making, as is represented by the pathmaster and his gang of hands. If any proof of this assertion is required, look at the practical examples everywhere about us. "By their works ye shall know them;" wherever a good piece of road can be found, it is impossible to trace its excellencies to any skill on the part of these road-makers. By accident, or perhaps by the annual tax not holding out, some natural drained portions of a road have been spared the annual coat of manure, (road-waste from the ditches,) this mending process proving a very material injury. We sincerely believe in some cases that have come under our investigation, that the road would, by its natural wear and tear, actually remain in a better condition than it is by being annually repaired by the unskillful representatives of a system that dates back to a barbarous age.

If one single argument can be advanced in support of this system, let him who unthink he can sustain it, step out and undertake it. If it is not false in every principle that applies to successful and strictly economical road-making, we are ready to acknowledge it. Proper enough in the feudal ages, when one of the conditions of the tenures was the making and repairing roads for the use of the Lord of the Manor, it seems out of place and inconsistent with the requirements of this enlightened age, and more like the last resort of a country or state on a war footing, than the operation of a system of internal improvements in a peaceful community; by this plan we never have had, nor ever will have good roads, and yet the value of the time and money expended on them would if judiciously and skillfully applied, be more than sufficient to put them in and keep them in first-rate order. The right time to do the right thing in the right place, is the essence of the principle—that brain to control which has studied the subject thoroughly, and mastered every principle of construction relating to it, that does understandingly and in the most proper manner all that is necessary, and whose qualifications should be those of a high order of merit.

It may be argued that the payment of a road tax will come more easy to pay in labor than money; but if it is easier to earn a dollar on the road than to furnish the dollar from the purse, why is it not full as easy to spend the same time in earning the money from another source and paying the road tax? The tax must be paid in money, or its equivalent in labor, and if it is honestly paid, the same labor elsewhere will earn the required amount. If an accomplished superintendent of roads should be furnished

these official returns for thirty years, from 1826 to 1855 inclusive, showing the money value of our exports of breadstuffs and provisions for each year by itself; and we have taken pains to ascertain the average for each of the three decades, as follows:—

VALUE OF EXPORTS OF BREADSTUFFS AND PROVISIONS FROM THE UNITED STATES TO OTHER COUNTRIES.	
Average for each year from 1826 to 1835,	\$12,736,236
do. do. 1836 to 1845,	\$14,307,111
do. do. 1846 to 1855,	\$5,376,054

Our Agriculture has therefore, in reality, constantly improved, with each succeeding cycle of years, a larger and larger surplus for foreign markets; there can be no doubt that the ten years to be included from 1856 to 1865 will show an increase upon the preceding ten, perhaps even more remarkable than is shown from 1846 to 1855 as compared with the previous decade,—when it will be noticed that the value of our exports of breadstuffs suddenly arose to be almost *three times* its previous average. As to the future, our contemporary need have no apprehensions whatever; the capacity of the country for production, and the increase of its production under a favorable demand abroad, are almost inconceivably great, and we have no fear at present of any privater force that shall prevent our sending our Breadstuffs in our own ships to any foreign port where we can get a fair price for them.

As frequently as we hear of American travellers crowding foreign routes—jostling one another on the Pyramids, the Museums of Paris and Berlin, attending High Masses at Rome, and Queen's Receptions at London—it is comparatively seldom we believe that the Show-Yards of the Great Societies have been made aware of the presence of question-asking Yankees, or the show-farms of the United Kingdom been trodden over by boots fresh from the fields and cities of the United States. And yet there has been scarcely a season perhaps, for many years back, that has not seen here and there a quiet observer from the dominions of Uncle Sam, passing from stall to stall at Royal Exhibitions, or bidding modestly at ram-letting and cattle-sale, or scrutinizing with some hospitable acquaintance the practical details of English Farming. We do not care to ask the consequences of such journeys; for while the evidence of their results is plainly enough seen in our own improved live-stock, and increased interest in those improvements of which Agriculture can be made capable in other directions,—it might apparently be claiming for ourselves an undue importance if we should add that the good has not gone altogether with the "course of Empire," westward,—that it is in fact our competition for the products of English skill in breeding, which has raised the price of its best animals at home and with other nations, and drawn from Continent and Colonies a grand source of income to reward the exertions of English breeders. And now that "John Bull has shown his confidence in the honor of Brother Jonathan," by purchasing, unseen, a round half-dozen at once of the Thoroughbred bulls, it is only polite of us to express the hope that some of our agricultural visits may likewise be returned, and that we may, hereafter, have the pleasure of reciprocity in extending mutual courtesies to the Agricultural tourists of one land or the other.

Among the visits made in this country last year, by his Royal Highness the eldest son of the present Presiding Officer of the Royal Ag. Society, was one at the farms of his Honor Mayor WESTWORTH near the city of Chicago—in commemoration of which visit it will be remembered that Mayor W. subsequently received from the Duke of Newcastle the very appropriate and welcome gift of a brace of South-Downs. We understand that Mr. WESTWORTH now proposes to embark before many months for a tour abroad; after the responsibilities of conducting an industrial political newspaper for a quarter of a century, and serving his district for ten years as member of the United States Congress and the city of Chicago for two years as its Mayor—he has not only well earned this respite for leisurely enjoyment, but is well qualified to represent, either at home or abroad, the people of the Great West where he has so long resided. And this, particularly, in an Agricultural capacity, since within 12 miles of Chicago he has a farm of no less than *twenty-five hundred acres of land*, where he has of late years been breeding probably some of the best stock the State of Illinois has yet seen.

—It affords us pleasure to mention Mr. WESTWORTH's proposed tour in Great Britain, because we know that our friends in that country are always happy to furnish every facility to the observant and discriminating inquirer; and because, moreover, one who is just retiring from twenty-five years' occupancy of the chair-editorial, appears to possess a peculiar claim upon his brethren of the quill in any latitude or clime—a claim which we can but think will be duly honored there as well as here.

We learn that Rev. J. KNOX of "Coal Hill," near Pittsburgh, has done a large business the present season in marketing strawberries in the city of New York—after an eighteen hour railway journey. It is stated that he has now 60 acres under this one fruit; his two principal varieties are Wilson's Albany Seedling, and Triomphe de Gand, both of which are of such firm texture that they bear transportation, and are so productive that 400 bushels an acre is not a large estimate of their yield.

We are indebted to Wm. THORNBURN of this city, for fine samples of the Wilson's Albany Strawberry grown by Mr. Oakley Osborne of Watervliet, and of the Austin Seedling from the Shaker gardens—both good specimens as respects size and quality of fruit. Also for a basket of Austin Seedling, selected for extraordinary size, to friend CHANCY MILLER—four of which weighed two ounces, and many others were but little short of the same standard. We were pleased to learn that this variety has done much better this year than last, and now apparently promises to equal the anticipations of its friends. Mr. THORNBURN, we may add, is agent here for a new kind of basket for marketing small fruits, which is very light, handy and neat, and must be quite durable and cheap.

Col. LEWIS G. MORRIS, after several years' retirement from the prominent position he so long and ably occupied as an importer and breeder of Improved Stock, is once more able to spare a limited number from his private herd of Short-Horns. An Advertisement of this fact in another part of this paper, will at once attract the attention of Col. M.'s old customers in every part of the country—all of whom may not heretofore have been aware that the Colonel has never wholly given up his favorite pursuit, but, during the period since his final sale, has been devoting no little attention to the management of a "select few"—the results of which care, we need scarcely say, would not be offered to public notice if they were not such as to do credit to the long and large experience of their owner and breeder.

Mr. GAIL BORDEN, Jr., has an establishment at Wassic, Dutchess county, for manufacturing "condensed milk" delivered daily to about 3,000 customers in the city of New-York. Mr. B. also puts up a condensed preparation of coffee, containing both the milk and sugar, a teaspoonful of which on being simply dissolved in a cup of hot water, produces as excellent a cup of coffee as the most fastidious would desire. We have received samples through Col. JOHNSON of this city.

BRIGHT ON GRAPE CULTURE.—We noticed a year ago at some length, this useful little treatise on what the author terms the "dwarf and renewal system" of culture; on the culture of grapes in pots; and on the management of grape manures. The second edition which now appears, contains many additional pages on manuring and management. Every grape raiser should read this treatise, containing as it does a large amount of practical directions on what may be termed the most artificial and the most thorough mode of raising fine grapes, although the author ostensibly argues with vigor in favor of "imitating nature." There are some eccentricities of thought exhibited in the work, but we greatly prefer a book that is original enough to be occasionally eccentric in this way, to a dull compilation. This edition contains 150 18 no. pages, is published by the author, and is sent by mail for fifty cents a copy. [See advertisement.]

DR. FARLEY'S VINEYARD.—We have spoken on former occasions of this fine vineyard, situated on a peninsula two miles from the village of Union Springs, N. Y. Some of our readers will be glad to learn that it escaped the injury so general throughout the country to the grape, from the severe and unfavorable winter, and that the vines are now making a fine growth and setting fruit. This success is no doubt to be attributed largely to the influence of the water of the lake which surrounds it, in softening the keenness of the winter air.

It will be seen that Messrs. INGERSOLL & DOUGHERTY of Green Point, offer to the public through our Advertising columns, their indispensable machines for packing Hay, Straw, &c., to which we call attention of interested parties as the season of baling draws near.

[For the Country Gentleman and Cultivator.]

Free Strawberry and Floral Exhibition at Chicago.

The Chicago Gardener's Society held a free exhibition to-day, June 26, mainly to draw out the strawberry growers of this vicinity. In this they succeeded partially, some very prominent growers being absent. Of kinds of strawberries sent, Wilson's Albany, for quantity and general effect, carried the day. —It is the berry in this market. Whole samples would measure 3½ and four inches round. Triomphe de Gand claimed precedence as to size—however, as well as flavor. Victoria was very showy, large and of high flavor. The grower of these has had them 6½ inches round—4 and 5 inches, numbers of them. Bieton Pine (white) was shown in splendid shape, Cremona's Perpetual, (who knows this?) was a splendid berry as to size, flavor and appearance, and the exhibitor says equal to Albany in productiveness. Dr. Blancy and others had very promising seedlings, especially as to flavor. Downer's Prolific, shown for the first time here, does not seem to have anything to recommend it. Other kinds, but all inferior looking samples, were McAvoy's Superior, Longworth's Prolific, Early Scarlet, Hooker, (good flavor but

undoubtedly shy bearer,) Prolific Hautboy, splendid flavor, small, but said to be a great yielder.

Three fine bunches of as many kinds of grapes, were exhibited by a citizen of Chicago, cut from pot plants, well ripened, and quite fine for this city and early season.

The tables around the fruit were well decked with pot plants from the different green-houses, and an appreciative crowd gazed on the skill of the gardener and cultivator. Chicago, Ill., June 26. EDGAR SANDERS.

[For the Country Gentleman and Cultivator.]

Crops, &c., in Cattaraugus County.

GREAT VALLEY NURSERY, JUNE 22, 1861.

EDITORS CO. GENT.—Having a few spare minutes, I thought to let your readers know something about how we are prospering here in Cattaraugus; though I have been too busy with nursery and farm work to make observations except in our immediate locality.

Last winter was one of the hardest on fruit trees that we have had for several years. Many small trees were actually killed, and the buds much injured on the large ones; then the spring was wet and cold and frosty, till the 25th of May. Since then, the weather has been favorable for the growth of fruits and farm crops.

The fruit crop will be light—not over one-fourth of an average crop. Currants and gooseberries are almost a total failure. They did not bloom at all—buds seemed to be killed by the cold in winter or spring.

Strawberries are doing splendidly—I never saw them better. If Wilson's Albany is as good elsewhere as here, I hardly think it deserves the condemnation it gets from some of our Eastern friends. Though not quite equal to the Hooker in flavor, it is decidedly a good berry. The Hooker is a splendid berry, but not a great bearer. Voor's Queen, received of S. P. Carpenter, New Rochelle, N. Y., is with us a very fine thing. It is a great bearer, nearly or quite equal to Wilson's Albany, being large, of uniform size, firm fleshed and good flavored.

Grass, the leading crop of Cattaraugus, is quite late, but doing well, and will doubtless yield an average crop. On new meadows, that were put down in good condition, the yield will be heavy.

Wheat is, in many places, considerably injured by the wire-worms; otherways it looks tolerably well. These wire-worms are getting to be a terrible pest, and we would like to learn of some feasible mode of exterminating them.

Oats are also injured by the wire-worms, and are rather small, but seem to be coming on well now.

Corn was planted from the 25th of May to the 5th of June, and is of course rather backward, but where well put in on good ground I never saw it look better. I however see a good deal of little sickly stuff, that will do well if it gets out of ground far enough to be killed by the frost next fall. Farmers are slow to learn that with good feed and good care, a corn crop pays well, but that a half-starved crop will be no crop at all. S. T. KELSEY.

Volume Eighteenth of The Country Gentleman.

In accordance with our usual custom, the present Semi-Annual Volume of the COUNTRY GENTLEMAN closes with the month of June. To induce our readers to extend its circulation for the *Eighteenth Volume*, from July 1st to Jan. 1, 1862, we make the following propositions:—

1. To any one sending us One new Subscriber for the Six Months, and One Dollar, we will send a copy of the ANNUAL REGISTER for 1861, (or for any previous year.)

2. For Two new Subscribers and Two Dollars, the ANNUAL REGISTER for any three years, or either of the following books:—

Cole's Am. Fruit Book.	Our Farm of Four Acres.
Cole's Am. Veterinarian.	Yale Lectures, cloth.
Eastwood on the Cranberry.	Week's Bee Manual.

3. For Three new Subscribers and Three Dollars, four copies (of any years desired) of the ANNUAL REGISTER, or either of the following books:—

Allen's Diseases of Domestic Animals.	Yount and Martin on the Hog.
Yount on Sheep.	
Bulst's Kitchen Gardener.	Guenon's Milch Cows.

4. For Four new Subscribers and Four Dollars, six copies (of any years desired) of the ANNUAL REGISTER, or either of the following books:—

Allen's Am. Farm Book.	Thomas' Am. Fruit Cultivator.
Breck's Book of Flowers.	Thomas' Farm Implements.
Quincy's Horse Doctor.	Quincy's Bee-Keeping.
Dadd's Diseases of Cattle.	French's Farm Drainage.

5. For Five new Subscribers and Five Dollars, a complete set (seven numbers) of the ANNUAL REGISTER, or either of the following books:—

Pinot on Grasses.	Remont on Poultry.
Pinot's Milch Cows.	Todd's Young Farmer's Manual.
Langstroth on the Honey Bee.	Jennison's New Horse Doctor.

AND LASTLY,

6. For Ten new Subscribers and Ten Dollars, we will, if desired, credit the sender one year on his own subscription to the COUNTRY GENTLEMAN, and send him a complete set of the ANNUAL REGISTER; or, if preferred, he may select either of the following valuable works:—

MAYHEW'S New Illustrated Horse Doctor—540 pages—illustrated with more than 400 engravings; or
HOBSON'S Comprehensive Farm Record—Arranged for Twenty-five Years Use; or
RURAL AFFAIRS—2 Vols., Cloth, nearly Nine Hundred Engravings together with THOMAS' AMERICAN FRUIT CULTIVATOR.

Hints on Health and Disease.

[For the Country Gentleman and Cultivator.]
More about Gormandizing and Dyspepsia.

In the issue of the Co. GEN. of May 2, and in reply to a "Suggestion to Medicus," by J. L. R., we submitted a few observations upon the evils and sufferings caused by gormandizing, under which title we included the two common, and, for reasonable beings, the two shameful, disgraceful practices, viz., firstly, that of eating too much, or stuffing down more than the system needs or can digest in a proper or healthy manner; and, secondly, that of swallowing the food too hurriedly, or without sufficient chewing or mastication. To these remarks upon the evil consequences of these two common and worse than beastly practices, we added some observations upon the origin or cause of these lamentable and disgraceful practices or vices, ascribing them, in a great measure, to an over-estimate of the gratifications of the palate or the pleasures of the table, and the consequent inclination to carry indulgence in these lower gratifications to an extreme, and to a too great disregard of what is taught by physicians, hygienists, and common experience, as to what is good and bad, wise and unwise, healthful and injurious in this every-day business of eating. Our practical conclusion from these seemingly well established truths as to the cause or causes of the vices and their providentially inflicted penalties which we had then under our consideration was, that the most effectual cure or prevention of these vices, and of the miseries attached to them as corrective punishments, is to be found in estimating much less, or as a much lower good, the mere pleasures of the palate, or the gratification thereof, and in being guided much more by the dictates of Reason, and by the lessons which Providence is daily teaching upon this subject in the sufferings which are inflicted by that Supreme Authority, and often stern Teacher, upon the transgressors of the laws of health.

As the vice of gormandizing is a very common and a very serious one, as well as one that is very severely punished by Providence—self-condemnation, loss of self-respect, discomforts of various kinds, dyspepsia, disease, and not unfrequently even death itself, being among the number of these punishments—and as in the hurrying times of haying, harvesting, and other kinds of work incident to summer, farmers and farmers' help are more than usually tempted both to eat too often, too much, and too hurriedly, it has occurred to us that we might resume the subject with some likelihood of contributing to the abatement of the evil and its manifold punishments or penalties. Certainly the desire and hope of contributing to such an abatement, were our main inducements to pen our previous article, as they are also now to resume the pen.

On the present occasion, we shall confine ourselves to the consideration of such of the penalties or punishments of gormandizing as usually pass under the title of dyspepsia. And that we may escape such misunderstandings, as seem likely to spring from the very vague and erroneous meanings quite commonly attached to this foreign (Greek) word and technical term, we premise that dyspepsia is, when appropriately employed, a general designation for almost all the derangements incident to the process of digesting our food and converting it into nutriment for the sustenance of the body. In this, its proper and professional meaning, dyspepsia is not "the dyspepsia," or a name for any one particular form of disease, but a general title for a great many forms of stomach derangement and disordered digestion.

In nine cases out of ten, or thereabouts, dyspepsia is the penalty of gormandizing in one or other of the two forms in which this vicious indulgence is practiced. In other words, dyspepsia, inclusive of a large variety of stomach ailments and derangements of digestion, is produced, in the majority of cases, either by eating too much or over-loading the stomach, or by bolting the food without grinding it sufficiently in the mill which Nature has provided. This latter faulty practice has much to do in causing the former or overloading the stomach, for when the food is bolted the feeling of satisfaction or having eaten enough does not occur so early as when the same amount of food is masticated more thoroughly and transferred to the stomach more slowly. Bolting the food, then, is a cause of dyspeptic complaints in two different ways; and for this fact it is easy to see the magnitude of this single mistake in eating, and how easily and obviously it may be prevented. Let dyspeptics, instead of becoming no wiser or not better by the corrective discipline of suffering which Providence is inflicting upon them for the very purpose of convincing them of their error and of making them wiser and better, or instead of resorting to drugs and doctors for the purpose of evading these Providential penalties of that kind of wrong-doing which they practice three times every day, or oftener; instead of doing, we repeat, either of these foolish things, let them simply eat more slowly and chew more thoroughly, and Provi-

dence may hold its hand and spare the rod, and drugs and doctors be found to be easily dispensed with, and hardly a less evil, however skillful or well-intentioned the doctors may be, than those dyspeptic sufferings which the Wise Creator and Preserver of our bodies has ordained as the corrective discipline of gormandizing folly, and of undue indulgence in the pleasures of the palate.

We pause for the present, but shall return to this highly important subject in a week or two. MEDICUS.

The Entomologist.

THE ARMY WORM AND CUT WORM.

We copy the following letter from our State Entomologist, from the last no. of the Journal of the State Ag. Society:

SALER, N. Y., June 6th, 1861.

Mr. B. P. JOHNSON—We are all familiar with the *Cut Worm*, that severs the young cabbage, beans, &c., in our gardens, and the corn in our fields. All tender succulent vegetation, including trees that are just started to grow from their seeds, is liable to be cut asunder at or slightly above the surface of the ground by these worms. They are the progeny of those dark colored "millers" that come into our houses on summer evenings and fly about the ceiling overhead. Though the worms are much alike they in reality are of many different species, the most of them belonging to the genus *Agrotis*, in the family "Noctuidæ."

The *Army worm* I suppose to be some one or more of our common *cut worms*, multiplied to excess, and when so multiplied, become gregarious and migratory just like the locust. This name, *Army worm*, is given to a worm which appears at irregular intervals, now in one place, then in another, immense numbers suddenly coming abroad and advancing over the country in a particular direction, like an invading army. Three years ago, Robt. Kennicot sent me specimens of these worms from Illinois, in a vial of spirits. They resembled the cut worm in every respect, except that their colors were more bright, which might arise from their greater exposure to the light of day than was their ordinary habit. They were greyish brown with stripes of darker brown and white. I wrote to have the moth bred from these worms, if possible, sent me, but have received nothing. Last October, Dr. Edward Jenkins of Talbot Co., Md., sent me three of the moths, but they were so broken, and their marks so totally effaced that I could learn nothing from them, except that they appeared more like an *Agrotis* than any thing else. I, therefore, do not know with certainty, what particular species the *Army worm* is.

In this section of the Eastern States, we at long intervals have had a worm with the same habits, and which has been here called the *Black worm*. In 1743, there appeared in Massachusetts "millions of devouring worms, in armies, threatening to cut off every green thing." (*Mint's 2d Rep.*, p. 36.) In 1770, a black worm about an inch and a half long, almost covered 2 or 300 miles of territory, devouring the grass and corn, moving mostly in one direction. (*Webster on Pestilence*, vol. 1, p. 259.) In 1790, the same worm reappeared in Connecticut, and was very destructive to the grass and corn, (*ibid.*, page 292.) In 1817, an account from Worcester, Mass., May 22d, says, "the *Black worm* is making great ravages in this town and many other places in this part of the country. Their march is in a 'displayed column' and their progress is as distinctly marked as the course of a fire. Not a blade of grass is left standing in the rear. From the appearance of the worm and its manner of destroying vegetables, it is supposed to be the same which usually infests gardens, and is commonly called the *cut worm*." (*Albany Argus*.) The same newspaper adds, that this worm is also destroying the vegetation in the northern towns of Rensselaer and the adjoining parts of Saratoga county.

Thus all the evidence we have, indicates that these travelling swarms of worms are nothing else but our own common cut worm. A. FITCH.

[For the Country Gentleman and Cultivator.]

Injury from the Cut-Worm.

A near neighbor of mine has a field of some eighteen acres, planted to corn about the 20th April. Two-thirds of this field was in clover in 1860, and in wheat in 1859—the other third in potatoes in 1859, and suffered to grow up in weeds in 1860. The corn all looked well till about middle of May, when it commenced dying, or rather the clover part did; the weed part looks well; the clover part had been replanted; till last week not a stalk was to be seen; it was then furrowed out and planted with early corn, and how it will do, can't say. On examination I found from four to twenty common grub-worms in each hill, (the common white grub.)

In had a field of clover and timothy sod, planted 3rd and 4th May; many hills in this field were killed by grub-worms, and a good part injured by worms eating the roots

of the corn. It is now growing well, but looks a little yellow. I have another field of over twenty acres corn adjoining, (planted to potatoes in 1860;) this looks fine, hardly a hill missing—planted 24th and 25th April Milton, Ky. WM. HALL.

The Dairy Department.

BUTTER.

No one of the dairy products, aside from Milk, comes so near being a prime necessity of life as Butter. We can very well dispense with cheese, at our daily meals; its absence from the table would scarcely be noticed; but if an American family could not have butter at all their meals and lunches, there would be trouble in the household at once.

The dairyman, of course, should not find fault with this universal and excessive use of butter. Abroad, in almost every family, butter is not used at meals where meats are served, and the practice is worthy of imitation. There the use of cheese is much more universal than butter, growing in part from the fact that it is the cheaper of the two.

By the United States Census of 1850, it appears that the proportion of butter to cheese over the whole Union was as three to one—for there was made in 1849, of

Butter..... 313,343,306 lbs.
Cheese..... 105,333,893 lbs.

While in this State, for the same year, there was made, of

Butter..... 79,766,094 lbs.
Cheese..... 49,741,918 lbs.

But the State Census of 1855 shows a large change, for in the year 1854 there was made, of

Butter..... 91,579,673 lbs.
Cheese..... 58,944,249 lbs.

The census figures do not show nearly all the butter produced—for there are hundreds of families with one or two cows who make for their own use, and are not counted with the aggregate.

Of all the butter which goes to market from this State, not one-fifth is strictly a prime article, and of that fifth probably a half may be deducted for a not perfectly pure article. Indeed, so limited is the section where the very best butter can be produced, that I doubt whether the estimate is not even now too high.

Over a large portion of the State good butter, for immediate consumption may be and is made, but it will not bear transportation. The best butter is made in Delaware, Sullivan and Greene, upon the brown shales of the Catskills. The next best is made in Lewis, Broome, Tioga, Chemung, Cortland, Cattaraugus, Steuben, Chautauqua, Jefferson, St. Lawrence, Allegany, Chenango, Herkimer and Oneida; and in these counties the best comes only from the hilly and mountainous regions which have been longest in pasture. Upon the old and rocky pastures of Putnam, Dutchess, Columbia, Rensselaer and Washington, good butter is produced, but as a general thing it will not compare favorably with that from the west side of the Hudson river. Short, sweet herbage, which only grows in perfection upon old pastures in hilly or mountainous regions, pure air, and soft pure water, are the indispensable requisites for pure butter. All these, however, without the skillful manipulations of the dairy woman, will avail nothing.

The dairy woman cannot do her part well if she do not have the advantage of proper fixtures and implements. A good, cool place for setting the milk in summer is absolutely indispensable, and there is no farm where cows can be kept profitably, that such a place cannot be provided at small expense. The use of spring houses is one of the causes for the good butter of the hilly regions. But a good spring house can be made near a well, and oftener much more convenient, as being nearer the house than the spring. I saw a very nice one, which answered an admirable purpose, and is a model of its kind. The ground was excavated about four feet by some twelve feet square, and a solid stone wall two feet thick, laid in cement, four feet high. The floor inside was also laid in cement, slightly inclining to one corner. The wall was carried up full width four feet, and then an offset of 18 inches was made to the rear, carried up two feet higher, and connecting with the wall to form the foundation. Upon this foundation was erected a balloon frame with eight feet posts, boarded outside and in, and the wall made as tight as possible. Upon the ledge created by the offset a wall about four inches high and wide is made on the front, by which, being well plastered with the cement, a gutter or vat is made some three inches deep, with a slight descent to the corner opposite to that where the water is introduced. Into this vat the fresh milk is set while warm, and cold water conducted into it from the well. The milk cools rapidly, and a low temperature is maintained through the day or night. At each milking the pans are removed to the shelves to make room for the fresh milk. Some very nice dairy houses are rigged up entirely above ground, and one I saw last summer in the town of Solon, Cortland county, was so arranged that it seemed almost as good as a spring-house. In that and many others, I noticed the pans were set upon shelves made by turning two narrow boards edgewise, so that the least possible surface was

monstrated that the temperature at which we can get the most butter, and that in the least time, in churning the cream alone, is from 14 to 16 deg. centigrade," (from 57 to 61 deg. Fah.)

We have devoted this extended space to the foregoing experiments not only on account of the light they throw upon the proper temperature at which churning should be done, but because they demonstrate how much of the butter which analysis finds in the milk, we fail to extract from it by the ordinary process of churning. This loss is very greatly reduced when the cream alone is churned, if the above experiments are to be taken as conclusive; but as no analysis is added of the milk after the cream was skimmed, we cannot tell whether all the butter it contained was taken off with the cream, or whether there is some loss here which is not shown in the above figures.

"Another phase of the Agricultural operations of that branch of the Patent Office," writes a correspondent of the COUNTRY GENTLEMAN, dating from Philadelphia, the 13th inst., "is now being acted out. A notice was recently published that the distribution of Cereals was going to commence 1st of July. The Philadelphia Agricultural Society have just received their portion, in the shape of a few muslin bags of wheat imported last year by the Patent Office. This wheat is not only badly cleaned, containing quantities of weeds, or something not wheat, which no farmer here would be willing to trust on his land without knowing what it is,—but the wheat itself is musty, and most likely will never germinate. A friend of mine who recently visited the Patent Office, says he saw there probably twenty hogheads of it, which they were very busy putting up in bags for distribution through the United States' mails. The cost of transportation to the government must be enormous, and as it is worthless the loss is total.

"My friend took one of the quart bags back to Washington to show them, when they denied at first that they had ever sent such, and that it did not come from there. The clerk who put it up was then called, and had to acknowledge it. How much they have already sent out I do not know, but from what my friend represented to them, it is probable no more will be sent out. It was purchased by Mr. CLEMONS, the late Chief of the Agricultural Bureau, last season in Europe."

—This is but a part of the letter referred to, and we may add that we have heard from other quarters similar objections as to the character of the grain recently distributed. We cannot think that the vast importance to the country, has ever been fully appreciated by the authorities at Washington—of having some one in charge of this Seed distribution thoroughly competent to undertake the task, who will not convert the post into an agency for the dissemination of noxious weeds and new insects, among the farmers of the country. We have enough of both, already, as we have proved to our cost; there is no doubt that many of them have been introduced through the carelessness and ignorance of seed importers—an error which we certainly ought not to employ a public agent to commit.

The London Agricultural Gazette copies from the COUNTRY GENTLEMAN our account of the Thorndale shipment of Short-horns, and adds a list of the several animals, their purchasers and prices:—

"The 2d Duke of Thorndale has been sold to Messrs. Howard & Robinson for 400 guineas; the 3d Duke of Thorndale has been sold to Mr. Macintosh for 300 guineas; the 4th Duke of Thorndale has been sold to Mr. Hales for 400 guineas; the Thane of Oxford has been sold to Colonel Pennant for 250 guineas; Imperial Oxford has been sold to Mr. Lawford for 200 guineas; 4th Lady of Oxford has been sold to Mr. McIntosh for 250 guineas. These have thus averaged 300 guineas. Besides these a young bull, Hero of Thorndale, has been sold to Mr. Welch for 200 guineas. These seven animals have thus fetched 2000 guineas, and Mr. Thorne has received the sum he gave to English breeders some years ago for their sires, the two Grand Dukes."

We notice in the report of the Essex Agricultural Society's Meeting at Romford, June 25, that Mr. MACINTOSH there exhibited, but not in competition for prizes, the 3d Duke of Thorndale and 4th Lady of Oxford. The report speaks of them as constituting a feature of no little attraction, and adds that this "American bull is a superb animal, thick, deep, fleshy and symmetrical, and of first rate quality."

During the night of the 22d June, there was a tremendous storm in France, extending through six departments, including hail which cut the crops to pieces, lightning killing men and many domestic animals, and blowing a hurricane which overturned barns and houses, and tore up the trees. This storm is not mentioned in the Mark Lane Express review of the progress of crops, July 1, and the extent of damage done had not been estimated in the Paris Journal of Practical Agriculture of July 5. But the latter paper represents it as so great that subscriptions had already been started for the benefit of the sufferers, headed by governmental appropriations from the Emperor of over eight thousand dollars, divided be-

tween the six departments. In England, during the week ending July 1, heavy thunder showers had considerably hindered the making of hay, but on the whole, the week had been regarded favorable:—"Many early-sown pieces of wheat on good soil are likely to be very productive; but the bulk remaining thin, and the breadth this season being diminished, a general abundance is next to impossible, however fine the quality may turn out. All spring corn, with the exception of heavy sown, continue highly promising, and even these are much improved, though the black fly is very prevalent. The root crops have equally advanced. The usual effects of fine weather have appeared in the state of the markets, notwithstanding small supplies of home-growth. New wheat has generally given way from 1s. to 2s. per qr., though farmers in some places with small stocks have resisted the decline; and but for foreign imports, which continue free, there would in all probability have been a rise instead of a fall for the last month. As it is, the week closed with more firmness, and a slight reaction may follow."

We have received samples of the STONE PIPE advertised in another column by D. E. HILL, Middlebury, O. Without having had an opportunity to test them in practice, we can only say that they seem to bear out fully the recommendation of the manufacturer, so far as workmanlike make and substantial appearance go. The prices, it will be seen, are very moderate in view of the quality of the pipe.

From the same maker we have specimens of MILK PANS, also made of stoneware, and as the process is conducted by machinery, we presume the prices must be comparatively low, although we do not know what they are. The advantages afforded by well made stoneware pans, over those of any other material, are generally acknowledged. The samples referred to may be seen at this office.

Mr. SIMON BEATTIE of Woburn, Scarboro, C. W., informs us that he is to sell by Auction on Thursday, Aug. 1, at Mr. Scott's, 10 miles from Toronto and 3 miles from the Scarboro railroad station, the following stock imported by him the past spring directly from England and Scotland:—One Short-Horn bull and one heifer, one Galloway heifer, one Ayrshire cow, several Leicester and Lincolnshire sheep, and one or two Cotswolds. We recently published an inquiry which we think has never been answered—where Lincolnshire sheep could be obtained; the above sale affords an opportunity, if the inquirer, whose address we have forgotten, desires to avail himself of it.

(For the Country Gentleman and Cultivator.)
LETTER FROM JOHN JOHNSTON.

NEAR GENEVA, N. Y., July 16, 1861.

MESSRS. TUCKERS—Wheat is not yet ripe with us. Some will be ready to cut next week, possibly some this, and some won't be ready under nearly two weeks. The crop as a whole will be a failing one, although some fields are very good. Those sheltered from the west-north-west, are generally good. Our friend J. O. SHERIDAN, Esq., has 7 or 8 acres of Soule's wheat equal to any I ever saw. On some farms you may see one field sheltered from west-north-west, a good crop, and another field on same farm, exposed to west-north-west, that won't yield 8 bushels per acre; but I am happy to say we have no midge, or at least almost none. I expected that, owing to the wheat being so late, it would be entirely ruined by that insect; but it is not here, and I hope it may never return.

Spring crops in general, are very backward; the weather generally too cold for corn. We have only had some 3 or 4 hot days this season. Although grass was very promising the 1st June, the hay crop will generally be light, perhaps not over half of last year. The corn crop in this neighborhood is less promising than last year. Winter barley has been nearly a total failure in this part of the country. Very little spring barley sown now; I have 13 acres, promising better than any I ever had. I never had much luck with barley, but I think I must have this year.

Every kind of trade is at a standstill; wool won't sell at paying prices, and grain of all kinds is low. I don't think corn and oats have been so low in 30 years. There is a good chance for speculators, as after every great fall there has been a corresponding rise until now, and I have no doubt whatever but the rise will come by and by. Some 18 or 19 years ago, everything but grain was very low. Cattle, sheep and wool went for nothing. After that, or in 1844, they commenced advancing and got very high. Now, I doubt not, they will for a time remain very low, and then a rise will come. This has been the way occasionally, every since I knew anything of the world, and in all probability it will continue so till the end.

I think the wheat will be of very fine quality. It is mostly out of danger of rust, which is often ruinous when the crops are so late. I notice rust in some fields, but I don't think enough to do much damage—and on the whole the winter wheat looks much better as it gets towards harvest; at least many fields that appeared ruined in May,

will yet yield enough with fair prices, to pay the expense of raising. I have got my haying done, and my neighbor, Mr. Swan, has 95 acres finished.

JOHN JOHNSTON.
P. S.—I had almost forgotten to say that a black bug has killed all the gray grubs or cut worms that formerly were so destructive to the corn. What does Dr. Fenton think about this? They have been seen to have a regular battle in this neighborhood, the black bugs proving the General McClellans, that is the conquerors; but they were not so humane as Gen. McC. they granted no quarter. But although we have got quit of the midge, gray grub, (cut worm,) I hear of a new pest to the farmer. A friend of mine, ten miles from here, writes me that the chintz bug has taken his 25 acres of corn. He thinks they were brought from the west in the stomachs of cattle. I cannot think so.

(For the Country Gentleman and Cultivator.)
CROPS IN CENTRAL OHIO.

MESSRS. L. TUCKER & SON—Our "harvest season" is just closing, so far as small grains are concerned, and prospective yields, results, &c., can be approximately offered.

Wheat, being the larger cultivated cereal, demands first notice. The early sowed fields, and those that promised best in early spring, are invariably poorest—lightest. This I attribute almost entirely to the action of the frosts of the 28th, 30th and 31st of May. Occasional fields not cut, partly from frost's effects, and partly from effects of "joint fly," which followed. Now, at harvest time, straw is generally short, standing erect from lightness of heads—much wheat being affected with midge, and nearly all full of cheat, (cheese of "Yankee Land,") and much rye intermixed. To sum up, the yield in the counties of Clark, Madison and Fayette, through which I have made pretty general and close observations, will not be above an average of from eight to ten bushels per acre. Last year in same belt many fields gave a yield of plump heavy wheat, (often weighing 64 to 66 lbs. per bushel,) of 25, 28 and 30 bushels, with chance fields making 35 to 40 bushels per acre. The grain this year is generally plump and good. Considerable "straw rust." Nearly all wheats sown broadcast.

Just here permit me to give your readers the result of some experiments I have been making with some new kinds of wheat. As the Patent Office distributed a considerable quantity of the same kinds last summer, I hope those of your correspondents who received same will favor us with their results.

From my diary I copy as follows:—"Selected 10 grains of each kind of 13 bags (quarts)—(these wheats were so much mixed and eaten up with weevil when received, that I considered it injudicious to plant more)—marked from 'Holy Land,' no names, 5 sorts white—6 red, very dark, with same number of grains of each of the following kinds: 'Maltese,' 'Genesee white,' 'white Turkey,' and 'Tappanahock,' and planted same on about 2 feet square of a black, loamy, burr oak soil, underlaid with gravelly limestone, near large open drain, on evening of September 26. Came up generally well, but were all 'winter killed,' except four last named. Have just harvested same, July 13th—not yet cleaned—1st kind rather green, late, straw strong, about 2 1/2 feet long, no rust, heads long, fairly filled—2d kind, do., straw quite badly rusted, heads long, not so well filled as 1st—3d sort fully ripe, early, straw weak, fallen some, 3 to 4 feet long, no rust, heads long, heavy—4th sort do., except straw not so long, and stronger—all bald white wheats. Intend planting same in September, selecting the largest ears, in rows both ways, about 2 feet apart, two kernels to the hill.

Oats late, just heading, promise well. Rye generally good, and standing up well. Barley, but little sown, fair. Corn promises generally an unusually good crop; some sections suffering from drought of last month; stands evenly, and not much affected with our usual pest on sod land, cut worm. Grass harvest but just commenced; generally heavy. Pastures good and abundant.

Large quantities of old grains are in hands of farmers, causing prices to rule low. Money market unusually tight, which also affects market rates of all produce. Old wheat, red, 60 to 75c; corn, 15 to 20c; oats, 15c; hay, \$3 to \$6 per ton in meadow and delivered. Wools selling but slowly and very low—good grades that last year commanded readily 40 to 50c. are now selling to some extent at 20 to 25c, and a few choice fine lots at 30c, an extreme figure, all to speculators. Hogs for fall feeding held at 2 1/2 to 3c. gross.

Some demand for horses for cavalry and baggage at from \$60 to \$90 each—the latter the extreme figure. Cattle very low, good lots of grades sold at our "monthly sale," July, at, for 1 year olds, \$14 to \$15 per head, and 2 year olds but a trifle higher, say \$15 to \$16—same ages, and poorer quality, have often commanded \$28 to \$35 per head.

Our people are imbued with a "war spirit," fully determined to make any sacrifices to sustain our government volunteers, and willingly submit to these unusual low rates for the public good. W. Madison Co., O., July 16.

The Entomologist.

[For the Country Gentleman and Cultivator.]

No. 29.—THE ARMY WORM MOTH.

MESSRS. TUCKER.—I have an illustration of "the pursuit of knowledge under difficulties" to present. Dr. John Bartlett of Pesotum, Champaign Co., Ill., sends us in spirits, in a tin tube, a specimen of the renowned Army worm, and of the moth which is bred from it. Now spirits is the very best vehicle in which to preserve and transmit all kinds of worms, spiders and beetles; but insects with delicate wings, such as butterflies, moths and flies are usually ruined by being wet, their wings becoming matted together in a wad, like a wet dish-cloth, and if prettily colored, their colors are liable to be altered or destroyed by spirits. An inexperienced collector, therefore, will do best to place such insects between layers of cotton in a small box, to transmit them without injury by mail or express.

On emptying the tube from Dr. Bartlett it was with deep regret that I saw this moth of the Army worm lying before me, soaked to a soft, shapeless, black mass, which might on drying wholly fail of showing me the same colors and spots which naturally belong to it. On carefully disentangling and spreading its wings, and drying it, my first step was to compare it with the broken and effaced specimens received last year from Dr. Jenkins of Maryland, mentioned in my letter to Hon. B. P. Johnson, lately published in the Co. Genr. I hereupon saw that the Army worm in Maryland last year, and that now in Illinois were undoubtedly one and the same insect. And now, by a searching look from one to the other of these soiled and imperfect specimens, I was able to gather from them certain marks by which I thought I could recognize this insect if I chanced to have any other specimens of it in my collection. Upon looking over the moths of the cut worms I find nothing like this among them. Turning then to another group, lo, here I have it!—two perfect specimens, received a few years since in a fine collection from Prof. D. S. Sheldon of Iowa College. *Laud De!* The riddle is now read! What for nearly a score of years I have been so anxious to obtain I now have! I know what the moth of this Army worm now is! And in the fulness of my joy hereupon, I thank you, Prof. Sheldon, and you Dr. Bartlett, and Dr. Jenkins, each and all, that you have collectively furnished me with such clues as have enabled me to make this discovery.

A short sketch of the history of this species, as it appears in our works of science, will interest the reader. Long ago, a preserved specimen of this moth found its way into the then celebrated collection of Mr. Francillon in London. Upon the breaking up and sale of that collection, this specimen passed into the possession of Mr. Haworth, who, not doubting but that it had been captured in England, described it very briefly, in the year 1810, in his *Lepidoptera Britannica*, page 174, naming it *Noctua unipuncta* or the White Speck, by which names it has ever since been referred to by English authors and collectors, save that a new generic name, *Leucania*, replaces that of *Noctua*. It appears to have been through inadvertency that Mr. Stephens changed this name to *impuncta*, when he came to describe the species in 1829, in his *British Entomology*, *Haustellata*, vol. iii, p. 80. Later, in 1850, he refers to it under its original name, in the List of *Lepidoptera* in the British Museum, p. 289, it having now been ascertained that it was a North American and not a British insect.

Guenée appears to have overlooked this species of the English authors. In his valuable work on the *Lepidoptera* (vol. v, p. 77—Paris, 1852,) he regards it as a new species, naming it *Leucania extranea*. From him we learn that there are specimens of it in several of the Paris collections, whereby they know it to be a common insect in North America, Columbia and Brazil. He also states that a variety of it which is destitute of the white dot on the fore-wings, occurs in the East Indies, Java and Australia. I cannot but think, however, that this East India insect should be ranked as a distinct species from ours, as it differs in such a prominent character, and is so widely separated from it geographically.

From what has now been stated, it will be seen that the original and therefore legitimate scientific name of this insect is *Leucania unipuncta*. And the "Army-worm moth" will undoubtedly be the common name by which it will be currently designated in this country, instead of the White Speck, the name given it in England.

About a dozen New-York species of this genus, *Leucania*, are known to me. They are those white and pale yellow moths or millers which are so common in our meadows and other grass lands, and which flit aside in such numbers when the scythe of the mower sweeps their coverts from them. And the "black worm," which in this section of our Union sometimes shows the same gregarious and migratory habits as the Army worm of the Western and Southern States, I now infer to be the larva of some one of these moths.

I have scarcely sufficient space remaining to give in his article such a full and particular description of this moth as ought to accompany this announcement of its name, and will enable every one to distinguish it with certainty from other moths which resemble it.

It is very plain and unadorned in its appearance. The eye, on first glancing at it, only recognizes it as an ordinary looking moth of a tarnished yellowish drab color, inclining to russet, with a small white dot near the centre of its fore wings, and a dusky oblique streak at their tips. On coming to look at it more particularly, we find it to be rather less than an inch long to the end of its closed wings, or if these are extended it is about an inch and three quarters in width, different specimens varying somewhat in their size. Its fore wings are sprinkled with blackish atoms, and a short distance forward of their hind edge they are crossed by a row of black dots, one on each of the veins. Outside of the middle of the wing this row of dots suddenly curves forward, and from this curve a dusky streak runs to the tip of the wing, the ground color being more pale and clearer yellow along the outer side of this streak. Though the moths of some other genera usually have a similar streak, this is the only species of this genus in which this mark occurs, and hence M. Guenée names this species *extranea*, i. e. extraneous, foreign, different, as though it did not belong here. And Mr. Stephens doubts whether it correctly pertains to this genus. But a character that will appear to common persons as more conspicuous and important, is that from which Mr. Haworth names this species. Nearly in the centre of the wing is a milk-white dot, placed upon the mid-vein. This dot is surrounded more or less by a dusky cloud, and this duskiness is frequently extended forward upon the mid-vein to its base, forming a faint darker streak along the middle of the wing. Contiguous to this dot on its outer side may be discerned a roundish spot of a slightly paler yellow color than the ground, and a very short distance forward of this is a similar spot, but smaller, both these spots often showing a more tarnished centre. On the hind part of the wing the veins are marked by slender whitish lines, and between their tips on the hind edge of the wing is a row of minute black dots.

The hind wings are smoky brown, with a purplish gloss, and are nearly transparent, with the veins blackish. The fringe of both pairs of wings is pale yellowish, with a dusky band on the middle.

On the under side the wings are much more glossy and paler, opalescent whitish inwardly, and smoky gray towards their outer and hind sides, where they are also freckled with blackish atoms. The smoky color on the hind wings has, on its anterior edge, a row of short, blackish lines, one placed on each of the veins, and in line with them on the fore wings is a faint dusky band, becoming more distinct towards its outer end, or sometimes only represented by a dusky dot on the outer margin forward of the tip. The veins are whitish, and also the hind edge, on which is a row of black dots placed between the tips of the veins. The hind wings have also a blackish crescent-shaped spot a little forward of their centre.

The abdomen or hind body is smoky gray above, and on its under side ash gray, freckled with black scales, and usually showing a row of black dots along each side.

Though these moths are subject to some variety, whoever has one of them in his hands will find it to coincide so exactly with most of the particulars stated in the above description, that he will be fully assured it is this insect.

Salem, N. Y., July, 1861.

ASA FITCH.

P. S., July 17th.—A fine specimen of this moth reaches me to-day from Mr. Emery, editor of the *Prairie Farmer*. It is a male, and indicates this sex to be smaller, measuring but little over an inch and a half across its spread wings. It is also of a darker or more smoky gray color, but does not appear to differ otherwise from the description above given.

A. F.

"I WISH I WAS IN DIXIE."

A writer in the New Orleans Delta has undertaken to give the geographical location of Dixie's Land," and to show that the song now so popular at the South originated at the North. The writer says:—

"When Slavery existed in New York, one 'Dixy' owned a large tract of land on the Manhattan Island and a large number of slaves. The increase of the slaves, and the increase of the abolition sentiment, caused an emigration of the slaves to more thorough and secure slave sections, and the negroes who were thus sent off (many being born there,) naturally looked back to their old homes, where they had lived in clover, with feelings of regret, as they could not imagine any place like Dixie's. Hence it became synonymous with an ideal locality, combining ease and comfort, and material happiness of every description. In those days negro singing and minstrelsy were in their infancy, and any subject that could be wrought into a ballad was eagerly picked up. This was the case with 'Dixie.' It originated in New York, and assumed the proportions of a song there. In its travels it has been enlarged and has 'gathered moss.' It has picked up a 'note' here and there. A 'chorus' has been added to it, and from the indistinct 'chant' of two or three notes, it has become an elaborate melody. But the fact, that it is a Northern song, cannot be rubbed out. The fallacy is so popular to the contrary, that I have thus been at pains to state the origin of it."

Letters to a Young Farmer.

[For the Country Gentleman and Cultivator.]

No. I.—Choice of Farming as a Profession.

HILL TOP, JAN. 6, 18—.

MY DEAR NED—You ask my advice about an employment for which you seem to think you have a peculiar aptitude. In the first place, I must tell you that you overestimate my ability to advise; but as deference to the judgment of elders is not a common fault with young America, and as it is one which we, who are approaching the superannuated list, can most easily forgive, I freely pronounce absolution, and will advise you as best I can.

But, Ned, you are the greenest boy I have seen. Let me tell you that you may be still more in error in supposing that you were born for the farm, or that you could by any possibility become a successful and happy farmer. You have not yet one particle of proof that you would be satisfied with farm-life if fairly installed into it. "Distance lends enchantment." Your views of farm-life are yet distant. The charm might fade as you approach, and die out when you come into actual contact with the stern realities. "Not all is gold that shines," and not all soils yield golden crops for the bidding. Farmers have their troubles. Mr. Sparrowgrass found a peck of them. Frosts would sometimes kill the growing crops; at other times the cattle would sicken and die; the neighbors even, were not as simply and as honestly rustic, as his imagination had conceived, but would now and then get a heavy horse upon him at a larger price than they would have been willing to pay for the same animal, or gain some other advantage about as slyly as he had been accustomed to see in city life. Set it down, then, that you do not yet know yourself in this matter, whether the farm is a fit place for you, or you a fit man for it. Uncle Zeb's coat being two or three times too large for you, would certainly fit badly if you should put it on; but any farm your father might purchase for you might prove a worse fit, so far as you have yet the means of knowing.

Another consideration—the good Watts says, "Heaven one mold for every two designed," and rumor says that you have found the other being cast in the same mold with yourself. I rather like the idea, that while you will to be a farmer, you are looking for a farmer's wife. But if your intended has no more decidedly marked tastes and qualifications for rural life than fall to a majority of city Misses, the doubt about the advisableness of your becoming a farmer, is doubled—for there will be two to be pleased instead of one. Not one in ten of all the city-bred girls, can be contented, happy and useful on a farm; to take a bright and beautiful being, witty and intelligent, (I speak of her as I am sure she appears to you,) from the circle of city friendships to the farmstead, unless you see in her that substratum of sober, deep, all-pervading good sense, which alone can congenialize itself to the change, would be absolutely cruel. So, Ned, look out what you do!

Possibly you and yours are dreaming about gentleman farming. Gentleman farming! Why, every upright, industrious, intelligent farmer is a gentleman in the best possible sense of the term. In the sense of wearing silk stockings and kid gloves, on small, delicate feet and hands, seven days in a week; in the sense of being a man, who commands every thing and does nothing; in any mere technical sense, no farmer can be a gentleman. Gentleman farming, any farther than as you consider that usefulness, integrity, inward worth, not the mere exterior, make the gentleman, is a humbug, alike useless to the man who attempts it and to the world. If one wished to live by sharp wit, he might better look for other fields than those of the farm. If he would be a fop he might better look elsewhere. If he would be a gentleman, as the term is too often flippantly used—exteriorly so—the farm is no place for him; and if his wife is more appreciative of the showy and ornamental, than of the plainly good and comfortable, there is an extra objection to his being a farmer. Do not deceive yourself with the belief that you can be a farmer, and yet retain all the primness and lightness of step, with which your friends in the city have been accustomed to meet you; and do not deceive the girl that is to share life with you, into the fancy that all the elegancies of city life will be transferred and become perennial on the farm. The matter of fact is, that farming is a plain, homely business; and it is wonderfully apt to make plain, unostentatious people of those who pursue it. The farmhouse may be very comfortable; it may be in elegant taste, and ought to be so; trees, shrubs and flowers may adorn every approach to it; the farmer may live in a condition of rural elegance, and he ought to be contented with nothing short of this; but after all, farming is a plain business, and makes plain people; and I would not advise persons to enter it with the expectation of being gentlemen or ladies, otherwise than as usefulness, integrity, in-

* These letters will sufficiently explain themselves, as having been written by a kind hearted old uncle, at home in rural affairs, to a young nephew in town—a would-be farmer for years, but slack a farmer in very deed, with sleeves rolled up and hard at work.

Society, was that held at Chicago in 1859, but we doubt if the receipts there exceeded \$25,000. The St. Louis Agricultural Association has taken in very large amounts on some occasions, but we have never seen the official returns; moreover, the element of Trotting Horses enters so largely into the character of these shows, that we hardly consider it fair to compare them with those in which there is no such attraction to create popular excitement. The Provincial Exhibition of Canada West at Hamilton in 1860, is also entitled to mention among the most successful shows on this side of the water; the receipts we do not know, but the Prince of Wales proved even a greater card in the hands of its managers, peculiarly, than the intrinsic merits of the affair, as great as these undoubtedly were.

We fear we shall be obliged to confess, therefore, that the Leeds Royal must "go to the fore," as the English say, for attendance as well as receipts, of all similar exhibitions outside of as well as in Great Britain.

— We are indebted to Mr. J. M. WADE, of Rhode Island, for copies of the Leeds Mercury, with very full reports of each day's proceedings. It may be noted that at the Dinner, Lord Powis the Chairman, in one of his leading speeches, remarked that "the Royal Agricultural Society were most anxious on such occasions to receive the representatives of those nations, both on the continent of Europe, and, he might add, on the continent of America, which were interested in Agriculture." In illustration of the enterprise and prosperity of English agriculture he alluded to the fact that that country "at the present moment was importing at considerable expense from America some of its best Short-horn blood, which in previous years had gone over to the United States,"—an announcement which is reported to have been greeted with much applause.

THE AUBURN REAPERS.—The city of Auburn, N. Y., stands in the midst of a very fertile farming region, and for a town of 10,000 inhabitants is largely engaged in the manufacture of agricultural implements. There are four mower and reaper manufactories, viz., one for the Kirby machine, manufactured by D. M. Osborne & Co.; another for the Hussey; a third for the "Cayuga Chief," made by Sheldon & Co., and the fourth for Balis, made by Ross, Dodge & Pomroy. Several trials of these machines have been made in different parts of the county, and all have proved very successful. In some instances the committees to award prizes have been puzzled to decide between them, and have handed back the entrance fees to the owners, and made no award. The dynamometer has shown varied results, sometimes in favor of one, and sometimes for another, the average being not widely apart. In mowing, cutting about 5 feet, 300 lbs. has been about the draft required, some below, and others above. On our own grounds we have had an opportunity of trying the Cayuga Chief of Sheldon and Co., and found it to work to much satisfaction. It could be made to cut within less than an inch of the earth, if desired, and its height of cutting might be increased to any degree. A piece of rough and sidling ground being selected, it proved itself equal to sustaining the rough usage required. It would cut perfectly when the horses were moving at the rate of only one mile an hour, or less, and did its work well in turning a circle of less than 6 feet radius. The horses appeared to draw it very easily, nearly as much so as they would draw an empty wagon. This remark applies especially to the small sized mower, the draught of which is exceedingly light. It has a peculiar and useful arrangement for elevating the points of the fingers at a raised angle to pass over stones. It is made of iron, and is strong and durable. Doubtless the other machines mentioned, or a part of them, are its equals in most particulars, but we had not the opportunity of testing them so well.

J. J. T.

THE HARVEST IN FRANCE.—At our last advices concerning the French crops, July 20, Harvest had already been completed in the South, was fairly under way in the Central departments, and would be soon undertaken in the North. Thus the character of the crop could not be completely estimated. But the Paris Journal of Practical Agriculture remarks that "if bad weather continued, if persistent rains came to compromise the housing of grain, the estimate would certainly have to be a very different one. But we must hope for brighter days in the last of July and during August. In any event," advice is given for the construction of the *mayettes*, described in the COUNTRY GENTLEMAN last year, for the protection of the grain from bad weather—"permitting cutting it a little before its maturity, sheltering it from unfavorable skies, and affording the means of bringing in the sheaves perfectly matured and preserved, at whatever time may best suit the state of the weather and the farm work." Previous storms—especially the tempest of the 22d of June, referred to in this paper a fortnight ago—prove to have done even more damage than had been anticipated. Rust had begun to show itself in some localities, although not as yet to the very great injury of the grain. Mons. Barral, in reviewing the returns from about forty correspondents in different parts of the country, inclines to the opinion that the product will be on the whole somewhat

below an average one. Forage crops and the after-math, he says, will be "decidedly less bad" than had been feared.

ADAMS CO., PA., AGRICULTURAL SOCIETY.—We are preparing for our annual agricultural exhibition, which takes place Sept. 23—26. Our list of premiums will be respectable. Our officers are JOHN BRINKHOLTER, President; Jacob Ditzer and Wm. Walhay, Vice Presidents; George Wilson, Recording Secretary; Wm. B. Wilson, Corresponding Secretary. Competition open to the world. We have about five acres of ground beautifully situated, with good spring water on the ground, and all necessary sary buildings for the comfort of man and beast. W. B. W.

Agricultural Items from the European Continent.

PREPARED BY THE EDITORS OF THE COUNTRY GENTLEMAN.

There are 600 Agricultural Associations in the French Empire, distributing about \$240,000 in the aggregate in premiums of various kinds. — — — — Complaint having been made that the French Ag. Exhibitions were only "got up," as we should say, for the benefit of land-holders and other wealthy men, Mons. BARRAL relates that he was present at the distribution of about 70 prizes at the late Show at Metz; "there were not ten persons who came for them *who wore coats*—more than 60 being peasants, vine-tenders, herdsmen, laborers, &c., in blouses and thick shoes, with their iron-shod sticks, and very proud of their success." — — — — That America, which has heretofore only sold *salt meat* to Europe, should have sent "real Durhams" to England, is spoken of in the Paris Journal d'Agriculture Pratique as proving *combien l'agriculture yankee marche vite dans le progres*—which may be freely translated to signify that the forward march of Yankee agriculture is a regular quickstep. — — — — The Prussian Bureau of Statistics has just published some interesting documents with regard to the progress of breeding domestic animals in that kingdom, from which we learn that there were in Prussia

Horses.....	1,240,000 in 1816.....	1,617,000 in 1853.
Horned Cattle.....	3,015,000 do.....	5,957,000 do.
Sheep.....	2,930,000 do.....	15,382,000 do.
Swine.....	1,494,000 do.....	2,577,000 do.
Mules.....do.....	340 do.
Asses.....do.....	7,236 do.
Goats.....	140,000 do.....	664,000 do.

Showing, by reducing other kinds of stock to an equivalent in cattle, that in the forty-two years, Prussia had increased the number of her domestic animals nearly one-half (43 per cent.) upon the live stock she kept at the commencement of that period. We are promised farther facts in connection with these figures, and at present will only call attention to the rapidity with which *Sheep* have increased in numbers with the improvement of agriculture, while *Cattle* have been almost at a stand-still—the increase in goats probably assisting to some extent in supplying whatever increased demand there may have been for milk.

Prussian agriculture shows a decided tendency to substitute bone dust for purchases of guano, and to mistrust the mixtures sold by manure makers. — — — — A trial has been made to introduce Ericson's engines in Prussia—as yet without success. — — — — Portable engines for farm purposes are still very rare there, the duty keeping out engines of English manufacture, and those of domestic construction failing to do their work well. — — — — Experiments made in Bavaria, in the preparation of peat, have excited a good deal of attention among agriculturists. There and in some other parts of Germany, peat is a very important article of fuel; we remember to have seen it in large open sheds to admit of ventilation, along the lines of some of the railways for engine use, just as in this country, the roads are bordered with wood sheds. — — — — Liebig and others have done much to call attention to the importance of utilizing the sewage of cities for manurial purposes, without any experiment having thus far been made to answer their efforts and expectations. — — — — The report of the Prussian Bureau of Rural Economy, from which these last items are taken, says that Short-Horns are there constantly coming into higher appreciation, although the results of purchases of them in England have not always proved satisfactory. — — — — The utility of great market fairs for the sale of animals of a particular kind is now fully recognized among Prussian agriculturists. A horse market established at Königsberg was sustained successfully in 1860; a sheep fair was instituted in Pomerania, and a horse fair at Bromberg.

Agricultural education appears to be advancing more rapidly in Germany than in any other country, if one may judge by the number of schools and pupils. In Bavaria it appears that they are now establishing "schools of

meadow culture;" one district alone (Upper Franconia) has three, and in Lower Franconia one has just been opened which already numbers 45 pupils and 12 professors. Efforts are also making for the establishment of "Schools of Sylviculture." — — — — In the central administration of Wurtemberg, it was lately proposed to appoint for each "circle" or district, a nomadic professor who should spend all his time in travelling, in giving agricultural advice and instruction, in preparing reports, and acting as an arbitrator or referee. This plan having failed to meet the approval of the ministry, several of the "circles" have chosen men of reliability to serve as "agricultural technologists," and charged them with what we take to be a sort of agricultural survey, together with such other duties as the interests of agriculture may demand. — — — — It is stated that Professor Rau has collected at Hohenheim twenty or more school teachers, to give them agricultural lessons, which they may in turn impart to their pupils during the coming winter sessions. — — — — In France, Agricultural education is not advancing as its friends could wish; nevertheless the means of extending agricultural instruction among all classes of society, are now studied and discussed, and improvements are hoped for "in the lot of the professors, and in the education of the pupils."

COST OF CUTTING HAY.

We recently published an estimate of the comparative cost of making hay as formerly practiced by the use of the scythe, hand-rake, &c., and as now performed by the assistance of the mowing machine, horse-rake, horse-fork, &c. The writer of these remarks and estimate, had practiced hay-making forty years, and had used the different kinds of implements and machines alluded to, and he intended to make a fair calculation, subject, however, to any corrections that might appear to be obviously required. We have just received a communication from a correspondent at Amsterdam, N. Y., which will perhaps excuse us for not publishing in full, but which states that the article above mentioned contains "false and erroneous notions, and misrepresentations," and adding, "I think it is designed to insult me"—he asks, "who do you suppose is fool enough to believe that hay cut by a machine does not need curing by cocking up, spreading, &c.;" he thinks it will require "a very energetic farmer to get in hay for 50 cents a ton;" and he concludes, "If I see another article in the COUNTRY GENTLEMAN so devoid of fairness and truth, I now advise you that you will get no more substantial support from me, and I don't care how soon the paper is stopped."

We regret that the estimate published strikes our correspondent so unfavorably, and at first we were at a loss to know why it should do so; but given on turning to page 173, vol. 11, of the COUNTRY GENTLEMAN, that he there made an estimate to show that scythes were more economical than machines. He is not alone in that opinion; although the number holding it is becoming rapidly less every year, as mowing machines are known, improved and cheapened. The estimate of the cost at that time is too great for the present; and taken altogether, he places the cost of cutting per acre at over one dollar a ton. This may be the case where a costly machine is used for a moderate or small farm. The estimate we published was founded on the usual charge of 50 cents per acre.* We are aware that on some large farms, it falls within this sum, and those who have good machines, and cut for the season, make money at it. Our correspondent admits a machine will cut over 8 acres a day; this would be over four dollars a day with one. If he will carefully read over his own article which we published in 1858, and the recent one to which he objects, he will find the most of the positions of the latter are in substance fully sustained by the former. We do not understand that he regards the horse-rake and horse-fork, as "insults," but as admitted improvements. Further examination and experiments will place the mower and hay sweep in their proper position. In the mean time, he must allow a free discussion of their merits, founded on carefully conducted experiments. Improvement will surely go on, even if "his paper is stopped."

* We have just seen a neighboring farmer, who cuts this year 180 acres of meadow, and in other years nearly as large an amount. He uses a Ketchum mower four years, and then sold it, in good condition, for half price. He thinks a good well-made mower will cut 1,000 acres; and that the expense per acre, including repairs, will not be over 12 cents, for its use. A team cuts 10 acres a day, which at \$2 a day, is 20 cents an acre—total 32 cents. But as horses are usually idle while men are using scythes, he thinks the real cost per acre, should not be placed at over 25 cents. On smaller farms, the actual cost would of course be more. He thinks mowing machines good savers of labor—reapers, far less so.

The Entomologist.

[For the Cultivator and Country Gentleman.]
No. 30.—THE GRAIN APHIS.

I have occasionally, in former years, noticed in fields of wheat a species of plant louse, of a bright grass-green color. But as only a very few of them appeared to be scattered about upon the grain, and I found no winged individuals accompanying it whereby I could determine its name and preserve it in my cabinet, I regarded it as a thing of no importance, and thus gave no attention to it.

About a year ago there was sent to the COUNTRY GENTLEMAN, I think from Columbia county, what was said to be a red insect that was thronging some of the fields of oats there. The specimens were evidently a plant louse, but were so dried up when they reached me I could make nothing satisfactory out of them; nor could I find any such insect then in the oat fields in my own neighborhood. W. Freeman, Jr., of South Adams, Mass., visiting me about the same time, informed me he had noticed a plant louse of a pale brick-red color, extremely numerous in a field of oats at East Hampton in that State. We thus know the insect we are to speak of was overrunning the fields in some places, last summer.

Early in May last, when rye and winter wheat were but a few inches out of the ground, I met with this insect, more numerous than any other, in every part of every grain field in my neighborhood. Towards the close of that month, specimens having wings began to occur. By inclosing them singly in vials, I found that the winged females usually gave birth to four young lice in twenty-four hours, whilst those without wings produced eight within the same time. And as the young grow to maturity and commence bearing in a few days, it will be perceived with what rapidity these insects multiply.

As yet they were scattered, one in a place, upon the leaves and stalks of the grain, puncturing them and sucking their juices. But as soon as the heads of the grain put forth, I observed they immediately began to cluster upon them, fixing themselves at the base of the kernels, on the outside of the chaff, with their heads downward, thus sucking out the juices which should go to swell and mature the kernels. And now the young lice, instead of scattering themselves and wandering away, as fast as they were born, settled down around their parent as close as they could crowd themselves together. Thus, in a short time, nearly every kernel of the grain in almost every head over whole fields, came to have a cluster of these lice at its base.

One of the most remarkable circumstances relating to these insects is the change in their color, which now began to take place. Whilst they were scattered about upon the leaves and stalks of the grain, they were all of a bright grass-green color. Now orange yellow or deep flesh red individuals began to appear among them. This color is so wholly different from green, that these orange ones might be suspected to be a different species. But green females placed in vials were found next day to have young with them of both colors—some being green, others orange. And a few days later, other green females were found to have orange young only, no green ones being born any longer. It is probably the change in the quality of its food which causes the insect to change thus in its color, the juices which the plant elaborates for the growth of its flowers and seeds being much more highly refined, nutritious and dainty, than those which circulate in the stalks and leaves where the insect at first feeds. And it is truly curious and wonderful that this green colored insect on coming to feed on the juices which grow the flowers, begins thereupon to give birth to young having a gay orange color similar to that of the flowers.

Before the close of June, I foresaw that these lice, multiplying so rapidly, would soon throng the heads of the grain in such excessive numbers as to attract public notice and excite alarm. It was about the middle of July, three weeks ago, that my neighbors began to bring heads of wheat in from their fields to me, to know what this insect was, and what they could do to remedy it. And for the past fortnight, scarcely has there been a day but that specimens have been brought or sent to me, from distances frequently of five and ten miles around; whilst every mail is bringing me letters and boxes containing it—six such having come to hand together, a few days since. From these correspondents, I infer that this insect is now swarming in all the grain fields that are drained by the Hudson river and its tributaries, and also those of the Connecticut. And it may very likely be similarly common over districts more remote, from which no information has yet reached us.

As the rye, wheat and barley become juicier, this insect gradually disappears from them, and becomes gathered upon the oats, these being still green and succulent. Hence the oats, before they ripen, are liable to be more thronged and overrun by it than any other kind of grain. Rye, on the other hand, grows so rapidly, and ripens so

early, that it escapes any perceptible injury from these insects. One of our correspondents, W. G. Cook of Catskill, states, "it is found on oats and peas as well as wheat." It is only where peas are sown among oats that this insect will be found on them, I am confident, nor will it feed on the pea. I have never seen any plant lice living on the peas in this country, nor is any species mentioned by authors as belonging to it in Europe. This is the more remarkable since the bean, and every other species of vegetation appears to have one or more kinds of these lice infesting it.

This insect is unquestionably identical with one that has long been known in Europe as being common at times in the grain fields there. It is scientifically named *Aphis Avena*, by Fabricius, and entomologists generally, a name literally meaning the aphid or plant louse of oats. But as the description given by Fabricius certainly differs in several particulars from this insect, Kirby and Curtis describe it under the name of *Aphis granaria*, and some of the German naturalists name it *Aphis cerealis*, whilst one of the latter, probably supposing the insect on barley different from that on oats, has entered it under the name *Aphis Hordei*. As it infests all other kinds of grain as well as oats, the "grain aphid," rather than "oat aphid," will be the most correct and definite name by which to designate it in English.

After what has been said above, every reader will know the insect I am alluding to. A detailed description of it is therefore unnecessary. Suffice it to say it is a plant louse similar to those we so frequently see on cabbage and other vegetation in our gardens and yards. The full grown female is shaped like an egg, and is scarcely larger than the head of a pin, being the tenth of an inch long, or a little less, soft or of a flesh-like consistency, slow and sluggish in her motions, of a grass green color, changing in hot weather to orange red or yellow, and having the honey tubes black, and also the antennae, except at their bases, the feet and the ends of the shanks and of the thighs. The winged flies are colored in the same manner, as is also the young, except in them the black parts are only smoky or dusky.

As to its habits I may briefly observe that all the insects we see on the grain during the spring and summer are females, some having wings, but most of them never acquiring wings. They do not bring forth eggs, but living young, which mature in a few days, and then commence bearing, without any intercourse of the sexes. It is only when cold weather is coming on, at the end of the season, that males are produced. All the males have wings. They may be distinguished from the winged females by being destitute of the little tail-like process at the end of the body. The sexes now pair, and the females thereupon lay eggs, placing them no doubt upon the fall sowed wheat and rye that is then up in our fields. These eggs remain through the winter to be hatched by the warmth of the following spring. The young from them grow up and commence giving birth to living young, no males and no eggs being produced, except as the closing act of its operations in autumn. Such at least is the case in other species of aphids, from whence I infer it will be the same here.

When this insect is numerous, as it is at present, it will undoubtedly be a serious injury to the grain crops. By sucking out the juice as it does, the juice which should go to fill and mature the kernels, it will evidently cause the grain when ripe to be dwarfish, shrunken and light of weight. Our farmers are often disappointed in finding their oats, when they suppose they have grown a fine crop, turn out much lighter by weight than they anticipated. I now suspect this deficiency is frequently occasioned by these insects preying, unobserved upon this grain.

As the career of this insect for this present year will be drawing towards its close before this communication can meet the public eye, I do not deem it worth while to make any suggestions as to remedies. The reader will be more interested in knowing what our prospects in reference to it are in the future. It having been so numerous last year as to attract notice in some places, and having multiplied this season to such an excessive extent, will it remain with us, infesting our grain fields thus in coming years? Shall we see it again next year as we see it now? No! The Philistines be upon thee, Sampson!

On many of the wheat heads may at present be noticed from one to a half dozen or more of these lice which are very large, plump and swollen, of the color of brown paper, standing in a posture so perfectly natural you suppose they are alive. Touch them with the point of a pin, you find they are dead. Pick off a part of their brittle skin; you see there is inside a white maggot doubled together like a ball. Put one or two of these wheat heads in a vial, closing its mouth with a wad of cotton. In a week's time or less you find running actively about in the vial some little black flies like small ants. These you see have come out from the dead lice through a circular opening which has been cut in their backs. Drive one or two of these flies into another vial, and introduce to them a wheat head having some fresh lice. See how the fly runs about among them, examining them with its antennae. Having found one adapted to its wants, watch how dexterously it curves its body forward under its breast, bringing the tip before its face, as if to take accurate aim with its sting. There,

the aphid gives a shrug, the fly has pricked it with its sting, an egg has been lodged under its skin, from which will grow a maggot like that first seen inside of the dead, swollen aphid. And thus the little fly runs busily around among the lice on the wheat heads, stinging one after another, till it exhausts its stock of eggs, a hundred probably or more, thus insuring the death of that number of these lice. And of its progeny, fifty we may suppose will be females, by which five thousand more will be destroyed. We thus see what efficient agents these parasites are in subduing the insects on which they prey. I find three different species of them now at work in our fields destroying this grain aphid. I have not space here to describe them. A particular account of them will be given in my Report in the forthcoming volume of Transactions of our State Agricultural Society.

And aiding these parasites in the work which they have been created to perform, are several other insects, to which I can only briefly allude. A Lady bug or Coccinella, (*C. 9-notata*, Herbst) a pretty little beetle, nearly the size and shape of a half pea, of a bright yellow or red color, with nine small black spots, has all the season been quite common in our grain fields, it and its larvæ feeding on this aphid. Another insect of the same kind, but much smaller, and black, with ten yellow dots on its wing covers, (*Brachycaucula 10-pustulata*, Melsheimer), is little less common. The Chrysopa or Golden-eye flies are also there, placing their white eggs at the summit of slender threads, that their young may feed on these lice. The larvæ of different *Syrphus* flies, small worms shaped like leeches, may also be seen on the grain heads, reaching about as an elephant does with his trunk, till an aphid is found, which is thereupon immediately grasped and pulled from its foothold and devoured. Attacked by so many enemies, this grain aphid, numerous as it is, will be so subdued, that next year I doubt whether it will be noticed.

Mr. J. S. GREENELL writes from Greenfield, Mass., that the wheat there is seriously injured by the maggot of the midge, but he cannot trace any connection between that and this insect. There is no connection between them, although they both operate alike in dwarfing the kernels of the wheat. In my own vicinity, also, the midge is numerous this year, though not one of its larvæ was to be found in the wheat ears last year. Certain I therefore am, it has other places in which it breeds, when an extremely dry June drives it partially or totally from our wheatfields. Some of our fields here will be more injured by it than by this aphid, notwithstanding the latter is so numerous. And I am now better assured than I have before been, we have no parasites, nothing whatever, that molest the midge, save only the yellow birds, and how inadequate they are to quell it, thirty years' experience shows. Seeing the natural parasites and other destroyers of this aphid in our wheat fields, so busily at work to conquer it, has brought to my view more forcibly than ever before, what a god-send it would be to have the natural parasites of the midge here, subduing it for us as this aphid is being subdued. These parasites would be millions of dollars annually in the pockets of the farmers of our State. They alone would enable us to sustain, yes, without feeling it, the heavy taxation which our present national disturbance must entail upon us.

ASA FITCH.

Salem, N. Y., Aug. 6, 1861.

The Bee-keeper's Department.

[For the Country Gentleman and Cultivator.]
A Novel Bee Freak—Invading Swarms.

On the 15th of July I had been out on the prairies a few miles, returning home about 3 o'clock p. m. The first thing I heard was that "two strange swarms of bees had come in a southerly direction and invaded a stock in one of our old hives. This seemed strange, but upon inquiry it appeared that the hives had been closely watched, being all in sight of the summer cooking apartment, and no swarm had left either of the only two old hives I have, and none was expected, because both had thrown off large swarms before. I had no alternative therefore but to acquiesce in the conclusion that one or two swarms of strange bees had actually come from some other place and "invaded" the old hive, which was pretty full before, and which, of course, must result in great commotion, and probably a battle of the queens during the evening and night succeeding.

On the morning of the 16th I had just returned from post-office, and sending a small boy home with the horse, commenced mowing, when in about ten minutes our oldest girl returned on the horse—I was half a mile from the house—to say that one swarm of the "invading" bees had just come away and were alighting in a tree near by. It was about half past eight, a. m. I rode home and hived the early moving swarm, about half a peck, quickly. About 4 p. m. another cluster came through the air, when I again left mowing and added these, about a quart, to the morning swarm. As I could not see a queen on the cloth used for the latter to move upon into the hive, I think the second cluster may have been made up of "stragglers" from the 8 o'clock swarm. They stay in the hive, and appear to be going to work.

As I never heard of bees swarming at 8 a. m. in a natural way, and as the morning was no more than comfortably warm,

LOVE.—As long as a woman loves, she does nothing else. A man has other matters to attend to in the intervals.
When is wine like a pig's tusk? When it is in a hog's-head.

Rural Architecture.

(For the Country Gentleman and Cultivator.)

A LARGE THREE-STORY BARN.

[The insertion of the following excellent general plan of a three-story barn has been unintentionally delayed, but it has lost none of its value by keeping. We are unable to give the plan of the grounds about the house on account of the large space they would require in an engraving.]

MESSES. EDITORS—Some three years ago I wrote a description of a barn which I had then lately built, for your paper, and as I was about communicating it to you, my attention was called to the subject of the horse pitchfork, which just then seemed to engross public attention. I therefore thought it prudent to wait a while, to see whether hay could be more easily pitched up than tumbled down; and notwithstanding the benefits of that fork, I am satisfied that hay will easier go with its gravity than be made to fly upwards.

The first thing then to be considered in building a barn, is to select a suitable site. The object was, convenient distance from the house—about 15 rods; supply of water, a hard bottom, and an easy drive through the barn, lengthwise with the roof, as the general floor, so as to throw the hay, &c., down, instead of pitching up. The stabling is in the basement.

The barn is one hundred and seventy feet long in the centre, besides an ell thirty feet. The creek through the yards is stoned up at the sides and filled back with clay, to prevent washing in from the yards. The creek runs through both cow and sheep yards, and twice under the barn.

The walls of the stabling, or basement, are of mason work, excepting at the deep bay and horse stable, and these are same distance from the ground, there being a depression there where the creek passes out from the yards and barn. The mason work is founded on the solid stable rock, which constitutes the floor of the stabling, cut down several feet in some places to form a convenient floor. The timbers at each end of the barn rest against the solid rock, which forms the bank. The barn has an angle, near the centre, of twenty degrees from a right line, to fit the bank. The following figure represents the first story or basement:—



FIG. 1.

- | | |
|------------------------------------|---|
| A. A. Stables for cows and steers. | H. Slaughter-house and straw-rooms. |
| I. Horse stables. | I. Henery. |
| L. Deep bay. | K. Sheep-yard, surrounded by creek, and rocks 20 feet high, covered with trees. |
| D. Sheep's apartment. | L. Cattle-yard. |
| F. Pigsty. | |
| G. Hospital. | |

The basement has windows on both sides, except against the ell, the hospital, and root room, where the bank rises to the top of the basement. The windows are in two sash each, made to slide by each other.

The second story is all in bays, excepting the henery is two stories. The ell in second story, is a carriage-room and workshop; and a space eight feet wide, leading from the centre of ell across the barn, to let feed chopped above on the floor, down; and also grain threshed on the floor above, to fall down. There are scuttle-holes to pass the hay down in front of stock.

The third story has the main floor running through the whole length of the barn; this is even with the bank at each end, by which we drive in at one end and out at the other. This is above the beams. The floor is eight feet wide, and the space for the load is wider at the top—a cross section of which is represented by the following figure. This makes the passage for loads ample, and yet no waste room. This floor is ample for thrashing either with machines, flails, or horses; and the advantage of being narrow is, the hay can be rolled off on either side over the girth. There are timbers placed on each side of the floor,

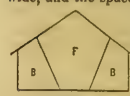


FIG. 2.

- | |
|-------------------|
| B. D. Bays. |
| F. Floor passage. |
- There are timbers placed on each side of the floor,

to keep the wagon-wheels in their place. Over the henery at the sides of passage floor, are cribs for corn; and at the other extreme end, are spaces at the side of the passage for mower, horse-rake, plows, &c. The hay-rack is drawn up to the peak of the roof over the floor by ropes.

The bays contain over 60,000 cubic feet, [and will therefore hold over 100 tons.] The capacity of this barn is equal to eight common barns, which cost about \$400 each. The cost of this was about \$1,500; so you will see that economy constitutes a prominent feature. I am about adding lean-tos on the sheep-yard side, as stabling for sheep or other stock; also a shed in the corner of the ell and barn nearest the house, where the ground rises to the second story, as a convenient shelter for horses and carriage, when harnessed and hitched on.

I find this barn as convenient, and I think more so, than any I have seen elsewhere.

Z. A. LELAND.

The Entomologist.

(For the Country Gentleman and Cultivator.)

Snapping Beetle—Blight on Apple Trees.

WEST PLATTSBURGH, N. Y., July 23, 1861.

EDS. CO. GENT.—Inclosed you will find an insect which I found under the bark of one of my apple trees. I was talking with one of my neighbors last night; he is in full faith that the enclosed insect is what has destroyed so many of our trees the past and this season. I wish you to give us your opinion in regard to the matter. The way the tree operates (from some cause, whether in consequence of the sting of this insect, or otherwise) is: The bark will commence and turn black on the body of the tree for 6 or 8 inches in length, and cleave from the wood, and then the sap, or some other substance will run down and destroy the bark to the root. It often occurs on the limbs; it then uses up the limb entirely, and whether its ravages will stop with the limb, is more than I can tell. I had, one year ago, as handsome an orchard as one would wish to see; but this spring there is something that makes a man's heart sick of trying to raise trees in this section. It is not only with my trees, but with all that are in this section. I have laid it to the hard winters and our dry summers for the past two years, but in conversation with this neighbor, as above mentioned, I could not make him believe in that, or that it was the result of anything but the work of this insect.

M. E. O.

The insect accompanying the above is a snapping beetle, one of the numerous species of the genus *Athous* in the family ELATERIDÆ. I have not leisure at present to study out its name. It is quite common to find the beetles of this group under the loose bark of dead trees. Their larvae are the well known "wire worms," which feed on the roots of plants, and some of them also on the bark and wood of trees, generally trees that are dead. I do not think this snapping beetle has anything to do in causing the malady to which M. E. O. refers. Some of my own apple trees are dead, and others are dying, from the same disease which he so well describes. I at first suspected it might be caused by the soap I was each year applying to the bark to repel the borers from the trees. But further observation satisfies me this is not the case. Several of my soaped trees remain thrifty and perfectly free as yet from this disease. Frequently the first commencement of it is where a limb has been sawed off in trimming the tree. It appears to me to be the same disease which has been so fatal in pear trees, and to which the names "fire blight," "sour sap blight," and "frozen sap blight," have been applied. But, except those which are occasioned by insect, I have not given that attention to the diseases of trees which entitles my opinion to much weight.

ASA FITCH.

(For the Country Gentleman and Cultivator.)

THE GRAIN APHIS AND LADY-BIRD.

A species of Aphides made its appearance on the oats in this neighborhood about the 18th of July. It was of a reddish brown appearance, and after a short time they assumed the form of a fly with wings. They gathered in clusters around the stem connecting the grain with the stalk, and deprived the grain of the juices necessary to its development. The larvae of the lady-bird were very numerous, and I never had such an opportunity of observing its habits. It is a pale blue insect with reddish spots along its sides, and it is quite an interesting sight to observe it seize upon these aphides and devour them, and then to watch its transformation into the beautiful lady-bird. I have been truly delighted in observing the changes it passes through; fastening itself to a leaf, the skin of the larva bursts open, and a reddish bug appears that gradually takes the form of a perfect lady-bird.

HUNTERDON CO., N. J.

J. W. L.

The Naturalist.

THE SPARROW.

The House Sparrow of Europe has an unpopular character. In some places, a price has been offered for its extermination, and Baffin sums up in the following style:—"It is extremely destructive; its plumage is entirely useless; its flesh indifferent food; its notes grating to the ear, and its familiarity and petulance disgusting."

No share of this odium, however, ought to be extended to the American Sparrows, for we know of no birds more deserving of our regard or protection. Their interests and ours never interfere; indeed most of their labors conduce to our benefit; and their music, though overpowered by the stronger notes of the Thrush and of the Robin, is always pleasing when it can be heard without interruption.

Of this family, the Song Sparrow is decidedly the finest. He visits us earlier in the spring than any other migratory songster, and sings to us for several weeks, almost without a competitor. The same notes are repeated many times in succession; he then changes and repeats others in the same manner.

"Of all our Sparrows," says Wilson, "this is the most numerous, the most generally diffused over the United States, and by far the earliest, and most lasting songster. It is the first singing bird in spring, except the black cap Titmouse, taking precedence even of the Pewee and Blue Bird. Its song continues occasionally during the whole summer and fall; and is sometimes heard (near Philadelphia, in winter. The notes or chant, are short but very sweet, resembling the beginning of the canary's song, and frequently repeated, generally from the branches of a bush or small tree, where it sits chanting for hours together. It is fond of frequenting the borders of rivers, meadows, swamps and such like places, and if wounded and unable to fly, will readily take to the water, and swim with considerable rapidity.

The Bay-winged Bunting.

This bird resembles a Sparrow both in manners and appearance. When flying it is readily known by two outside white feathers in its tail. Though not gregarious, they appear in considerable numbers along the road, and we suspect they are fond of rolling in the dust. The notes are rather louder but less musical than the Song Sparrow; and in the morning and evening their vivacity seems to be increased by the emulation of numbers.

"This bird," says Wilson, "delights in frequenting grass and clover fields, perches on the tops of fences, singing from the middle of April to the beginning of July, with a clear and pleasant note, in which particular it far excels its European relation. They frequent the middle of fields more than hedges; run along the ground like a lark, which they also resemble in the great breadth of their wings. They are timid birds, and rarely approach the farm house." C. N. V. Henrietta, Aug. 1861.

ANECDOTES OF ELEPHANTS.

AN INTELLIGENT ELEPHANT.—"Tell my grandchildren," said the late Right Rev. Daniel Wilson, writing home from India, "that an elephant here had a disease in his eyes. For three days he had been completely blind. His owner, an engineer officer, asked my dear Dr. Webb, if he could do anything to relieve the poor animal: The doctor said he would try nitrate of silver, which was a remedy commonly applied to similar diseases in the human eye. The huge animal was ordered to lie down, and at first, on the application of the remedy, raised a most extraordinary roar at the acute pain which it occasioned. The effect, however, was wonderful. The eye was, in a manner, restored, and the animal could partially see. The next day, when he was brought, and heard the doctor's voice, he laid down of himself, placed his enormous head on one side, curled up his trunk, drew in his breath just like a man about to endure an operation, gave a sigh of relief when it was over, and then, by trunk and gestures, evidently wished to express his gratitude." What sagacity! What a lesson to us of patience.

MEMORY OF THE ELEPHANT.—A female elephant belonging to a gentleman in Calcutta, who was ordered from the upper country to Chittagong, in the route thither, broke loose from her keeper, and making her way to the woods, was lost. The keeper made every exertion to vindicate himself, which the master of the animal would not listen to, but branded the man with carelessness, or something worse; for it was instantly supposed that he had sold the elephant. He was tried for it, and condemned to work on the roads for life, and his wife and children were sold as slaves. About twelve years afterwards, this man, who was well known to be acquainted with breaking elephants, was sent into the country with a party to assist in catching wild ones. They came upon a herd, and this man fancied he saw among the group his long lost elephant, for which he had been condemned. He resolved to approach it; nor could the strongest remonstrance of the party dissuade him from the attempt. Having reached

as a safe rule, both in Great Britain and here, that no Society can expect to pay its way, without aid from the locality in which the Shows are held—at least, if its Premium List, and the accommodations it affords to exhibitors, are at all commensurate with the demands of the present day.

AN EXPERIMENT IN HAY-MAKING.—A good deal of discussion has occurred at different times as to the cost of manufacturing hay with modern machinery. A few days since, we performed an experiment, using a mowing machine, old-fashioned revolving horse-rake, and Gladding's horse-fork. We report the trial made, because it was performed without any view whatever, to such a report, most of the hands being rather inexperienced, and without the superintendence of the proprietor. In most cases, farmers would drive work much more expeditiously, even for ordinary every-day business. Instead of unloading a ton of hay in five or ten minutes, twenty was more commonly consumed in this experiment. The hay was drawn over half a mile, which also required more time than would be necessary in other instances.

Cutting 5 acres of clover, paid 50c. per acre..... \$2.50
3 men 2 hours each, raking and bunching..... 0.50
3 men and 1 team, $\frac{1}{4}$ of a day, drawing..... 4.00

Cost of making and drawing 5 tons..... \$7.00
or 87½ cents per ton. The men were working by the month, at a little less than a dollar a day, and the team alone was estimated at over two dollars a day, which is more than farmers would usually allow. We think it would be safe to estimate the cost of manufacturing and storing hay, with all the contingencies of weather and accidents, at a dollar a ton as the highest; and in many instances, with the best management, it would cost but little over half this sum, by using mowing machines, horse-rakes and horse-forks. J.

RULES FOR GOOD FARMING.—In looking over a back number of the *Prairie Farmer*, we find a set of "rules for making farming profitable," contributed by a correspondent, G. A. Kemble, of Schuyler Co., N. Y., and evidently intended to be passed as original. They are copied word for word from p. 330 of the *Illustrated Annual Register*, for 1860. No blame, of course, is attached to the Editor of the *Prairie Farmer* for publishing these excellent rules without credit, which he had every reason to believe now.

MR. HORACE L. EMERY, of the Albany Agricultural Works, sailed for England on Saturday last, with the view of establishing more direct commercial relations with customers in Great Britain and her Colonies, and to introduce his Machines, if possible, to more extensive use in Europe. This journey has been for some time in contemplation, and we trust its results may more than equal the anticipations that have been entertained. There is no better field for the proper employment of American energy and inventive genius.

THE GRAIN APHIS AGAIN IN DUCHESSE COUNTY.—I notice you speak of the Aphis not appearing where it did last year, and sincerely wish we could bear you or rather Dr. Fitch out in the statement; but, unfortunately, the oat crop, which was seriously injured last year, will be damaged much more this. I do not know of a single field of that grain in this neighborhood that is not peopled with them. S. T. Thornegate, July 24.

THE GRAIN APHIS.—This insect, which did so much damage last year to spring wheat and oats, in some parts of the country, has again made its appearance in this vicinity. Some spring wheat belong to James Farrington of Dedham, has been attacked in considerable force, and will be more or less injured. We have heard of several other cases. The amount of injury done by the insect depends chiefly on the stage of the crop at the time of attack. If it is quite green, the sap will be consumed by the parasites to such a degree that the grain will not fill. On the other hand, if the crop is considerably advanced when attacked, the straw will soon begin to turn, and the parasites will perish for the want of their natural support. All species of aphid have been unusually abundant the present season. The leaves of cherry trees, wherever new shoots were put out, were soon covered by myriads of lice which bred there—the full-grown ones shining like little black beads. The new shoots of the currant were attacked in a similar way by a species peculiar to that shrub. But the lice were soon found by numerous enemies, which pursued them with a rapacity so unrelenting that in a short time they were nearly exterminated. The various species of lady-birds, *Coccinella*, the larva of several species of *Syrphid*, and the larva of the lace-winged fly, *Chrysopa*, cleared the currant bushes from every louse in less than a week.—*Boston Cultivator*.

The First Number of a NEW VOLUME of the COUNTRY GENTLEMAN is here presented to its readers. We need scarcely say how highly we shall appreciate any efforts that may be put forth by its friends to increase its present circulation. Subscriptions will be received on the customary terms, either for Six Months or One Year, as may be preferred:

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Those who subscribe for a year, and who prefer to have their subscriptions date back to January 1, 1862, can still be supplied with back numbers for the past six months.

Albany, July 3, 1862.

Crops, &c. in Western New-York.

Near Geneva, 22d July, 1862.

MESSES. EDITORS.—I suppose you are aware that many men, when in trouble, like to let their friends know it, expecting their sympathy. Our trouble here is—our wheat has been ready for harvest for some time, but it rains daily and nothing can be done. We have a fine crop in Western New-York of everything as far as I know, but should it continue such weather for another week, as it has been for the last, and is now, the damage to the wheat crop will be very serious.

I am told the grain aphid is very bad in the spring wheat, and much sooner than it appeared last year, which will make it more destructive. There is some in my barley, the first I have seen of that insect, but the barley being now ripe, they can do little harm.

We have a very fine prospect for a corn crop in this neighborhood—I think never better. I never saw it make such a rapid growth. Mine was quite small at 18th June, I don't think any of it was a foot high, and on the 14th of this month I measured considerable that was over six feet in height. It is almost incredible, but so it is; and although it is three and a half feet plump between the rows, the ground at the above date was completely covered; but I am told the corn that was frost-bitten at the 15th June, looks poor, but I have only seen three crops of corn in the last month—the one north of me is still larger than mine—the one south would be called a great crop in common seasons.

A week ago to-day we had a tremendous blow. It was a tornado in some places, only two miles from here, breaking and uprooting large oaks, and those that would neither uproot nor break were twisted in two. The rain fell in torrents. My barley was laid as if rolled, and my corn laid as flat as could be. The corn has straightened up fully, and the barley crept up a little. Strange to say, the highway only divided the wheat and corn fields, yet my wheat stood as well after the blow as before, and that is well enough. I notice by the papers the gale extended some 50 miles west of us, or rather commenced there; in many places there was hail; here a very little. It rains while I write, 6 P. M.

JOHN JOHNSTON.

CROPS IN ILLINOIS.—The following extract is from the *Illinois Farmer* for July: The winter wheat crop in Egypt is very fine, better than for years past, and in Central Illinois it is much better than anticipated at the time of our last issue; the heads are long and well filled, but we must put in our protest against foul seed. Chess and rye are altogether too abundant, in fact in some fields it is difficult to say which predominates. The chess controversy will continue so long as the farmers have no barns or good fanning mills, but as these come in chess will go out. In good barns the seed wheat will be threshed with flails or horses and not be injured by passing through the sharp edges of the fast revolving thrasher which is the chief cause of so many poor stands, allowing the chess which no beating can injure, to fill in the vacant space. By culling the rye out of that portion of the crop used for seed this nuisance can be abated.

The corn crop is backward, but, on the whole, promising. Our corn crop is the best that we have seen in our late excursion through several states south. In Tennessee we saw a few fields, more favored, but the average even there was below, and we again call attention to the value of early planting, and that to follow the plow at once and roll. The rye crop is fine, and oats give thus far good promise. In Tennessee and Mississippi the wheat and oat crops are almost entirely ruined with the rust. Not a tenth part of the seed sown will be harvested. Of the crops in the north part of the State we know nothing personally, but we trust the heavy rain and cold spells have checked the ravages of the chinch bug. In the other parts of the State the promise of farm crops and fruit is all that could be asked.

THE POSEY COUNTY (IND.) AGRICULTURAL SOCIETY will hold its Fourth Annual Fair at New Harmony on the 7th, 8th, 9th days of October next. A letter from L. PELHAM, Esq. of that place, mentions the above, and adds that the wheat crop in that section is fine, the oats rusty, and the corn promising a good crop.

The Entomologist.

(For the Country Gentleman and Cultivator.)

No. 32---THE ASPARAGUS BEETLE.

The asparagus is justly characterised as "one of the oldest and most delicate of culinary vegetables, no less praised in ancient Rome, by Pliny, Cato and other writers, than at the present day." (*Wood's Botany*.) This plant grows wild in the maritime districts of the middle and southern parts of Europe, and there, in its native locality, are several kinds of insects which feed upon it, and which are pests to the gardeners of those countries. Much the most common and hence the most destructive of these insects is known by the name of the Asparagus Beetle.

Of the group or genus *Asparagus*, some two dozen species are known to botanists. About half of these are found in the vicinity of the Cape of Good Hope; the rest occur in southern Europe and the East Indies.

Being thus numerous and widely diffused upon the Eastern continent, it is rather remarkable that no plant of the asparagus kind is found in any part of America. And consequently, we have no insects here which feed on plants of this nature. Therefore, when the garden asparagus was brought here from Europe, it was able to grow with us without injury or molestation from insect enemies. It is now in universal cultivation, everywhere through the United States, north and south. Yet neither of the insects which depredate upon it in Europe has ever been met with in this country, nor do any of our American insects attack it. Thus it has been our happy lot to grow this one valuable plant, wholly free from the annoyance of seeing it marred and mutilated by those insect depredators which give us so much vexation and trouble with about every other kind of vegetation which we attempt to cultivate.

But an insect devouring the asparagus has at length made its appearance on our shores. DANIEL K. YOUNG, of the Queens County Agricultural Society, in a letter to the COUNTRY GENTLEMAN, dated Matinecock, June 16th, says:

"With this I send some insects which have been eating the asparagus since the middle of May, and continue at this time in such numbers as to destroy in some localities nearly half the crop. Soon after the bugs made their appearance, they commenced depositing eggs upon the young shoots. These eggs in a short time hatch out a dark colored worm, which, as well as the parent bug, lives entirely upon the young shoots, mutilating and in most cases destroying them. As this is the first insect which has injured our asparagus, we are anxious to know what it is. * * * I hope you will give the insect your attention, as it threatens to destroy this valuable Long Island crop."

This remittance, forwarded from Albany, reached me June 24th. In the box, with slips of asparagus which had become moldy and semi-putrid, I found a dead beetle, three living larvæ, and several black grains which the microscope showed to be minute larvæ which had hatched from eggs which had been inclosed in the box and had perished. The three large larvæ, placed on a fresh slip of asparagus inserted in a vial of water upon my table, fed thereon with evident relish, until on the morning of June 30th they had disappeared—indicating that they do not fasten themselves to the plant to become pupæ, but leave it and enter the earth—which in this instance, being within doors, they would perish before they would find.

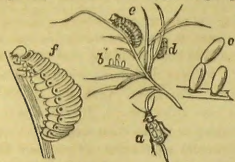
The beetle in the box, on a moment's inspection, was found to be the noted Asparagus beetle of Europe. It is a species so peculiarly and plainly marked that any one accustomed to examining insects will not be liable to mistake it. But that the reader may be more fully assured that my judgment upon this important point is correct, I may state that I have in my hands specimens of the European Asparagus beetle, received from Mr. Westwood, London, and also from Andrew Murray, W. S., Edinburgh, which specimens enable me to be positive that the Long Island insect is the same.

I will now present a brief history of this insect, with such a description of the beetle and its larva as will suffice to enable any one to clearly identify them when found upon the plant they inhabit.

The Asparagus beetle is scientifically named *Crioceris Asparagi*, its specific name having been given it by Linnaeus a little over a hundred years ago. The generic name, *Crioceris*, was suggested by the horns or antennæ of some of the insects of this group, which have some resemblance to a braid of hair or a twisted cord. They pertain to the order COLEOPTERA and the family CRIOCK-

RIDG. Of this genus, *Crioceris*, we have several species inhabiting the United States. One which the reader will be most apt to know, is the Three-lined leaf-beetle, (*C. trilineata*), a common insect upon potato vines, and much resembling the yellow striped bug upon cucumbers, but differing in not having the head black.

The Asparagus beetle closely resembles this of the potato in its form and size, but not at all in its colors. In the annexed cut at a, it is represented its natural size, its length being a quarter of an inch or a little less. It is a beautiful insect, of a shining blue-black color, with the thorax bright tawny red, and on each wing cover are three lemon-yellow spots placed in a row running lengthwise. The wing covers are further ornamented with an orange-yellow border upon their outer sides, and the middle and hind spots have their outer ends united with this border. The under side, the legs and antennae, are black. The insect varies in having the spots on its wing covers sometimes larger, whereby the anterior and middle spots become united together. On the thorax, too, there are usually two small black spots, which are sometimes larger and more or less completely united into a single large spot.



ASPARAGUS BEETLE.

a. The beetle, natural size. b. Its eggs. c. Its eggs magnified. d. The young larva. e. The larva full grown. f. Full grown larva magnified.

Mr. Westwood, in his Modern Classification of Insects, from which work the figures of the above cut are copied, informs us (vol. 1, p. 374) that these insects grow up and complete their transformations in a few weeks. The eggs (b and e) are oblong oval, and are placed on the plant by one of their ends, one egg being sometimes attached at the end of another.

The worms or larvæ which hatch from these eggs (see cut, d, e, and f) are of a dull ash gray or olive color, often with a blackish stripe along the middle of the back. They are soft and of a flesh-like consistency, about three times as long as thick, thickest back of the middle, with the body much wrinkled transversely. The head is black and shining, and the neck, which is thicker than the head, has two shining black spots above. Three pairs of legs are placed anteriorly upon the breast, and are of the same shining black color with the head. As will be seen when it is crawling, the worm clings also with the tip end of its body, and all along the under side may then be seen two rows of small tubercles slightly projecting from the surface, which also serve as prolegs; and above these, on each side is a row of elevated shining dots like warts, above which the breathing pores appear like a row of minute black dots. It moves very slowly, and when menaced with danger, a black fluid comes from its mouth. When it is done feeding, I suppose that, like other species of *Crioceris*, it crawls into the earth, where it lies dormant during its pupa state, which in summer probably lasts ten or twelve days, when it changes into a beetle, and comes out to feed again upon the asparagus and deposit its eggs. Those larvæ which descend into the earth at the close of the season, probably remain there in their pupa state through the winter, and give out the first beetles which make their appearance the following year.

We come next to consider how we are to combat this enemy that has now invaded us, and protect our asparagus from ruin.

In Europe they have had long and ample experience on this subject. Every remedy that can be thought of, every protective expedient which human ingenuity can devise, has probably at one time or another been there resorted to, and its efficacy fully tested. And as the result of the efforts and observations of the gardeners of the different countries of Europe from time immemorial, we are told there is one remedial measure which is effectual, and one only. It is given to us in a single line of Kollar's Treatise, as in other publications, that "the only means of destroying these insects is picking off and killing the beetles and their larvæ by hand."

Those who see these insects over-running their asparagus as they do, perhaps in thousands, will be inclined to regard it as a hopeless undertaking, an endless task, to pick off and destroy every individual of the vast multitude. Reader, let me assure you,—as I can from my own experience in this remedy of hand-picking—you will find the labor far lighter and less irksome than you suppose. When this work is resolutely entered upon, you will find that you soon acquire a love of it. It ceases to be a labor, it becomes a pastime; so much so that when the last one of these vermin is destroyed, it will be with a feeling akin to regret, that, on looking over the plants, you find there is no more of this work for you to do.

And must we now have this insect to combat, this task to repeat, year after year, we and our children after us,

through all coming time? The inquiry is certainly a most important one. The asparagus was brought to this country no doubt, about the time that the first European settlers emigrated hither. For upwards of two centuries, therefore, it has been growing upon this continent wholly unmolested by insects. How has this, its worst enemy, happened to follow it here now, at this late day? Probably some enterprising nurseryman or gardener in receiving from his European correspondent a choice variety of this plant, in the pot of earth in which the roots were transmitted, has unfortunately had some of the pupæ of these insects lurking, from which both male and female beetles have hatched. Certain it is, that some such contingency has occurred to bring this insect here as had not occurred for two hundred years before, and might not occur again for a hundred years to come. Having now obtained a foothold, it will undoubtedly multiply and extend itself everywhere over our country. Indeed there is the strongest probability that, like so many other insects when newly imported, this also will become vastly more numerous and destructive in this country than it has ever been known to be in its native haunts; and that the asparagus, hitherto so cleanly and inviting, we shall henceforth know only as being worm-eaten, filthy, and repulsive.

But is it not possible to exterminate this insect, and not allow it to extend itself and become permanently established in our land? I think it is. I suppose this insect is at present limited to a comparatively small district in the vicinity of the city of New-York. As it grows to maturity in a few weeks, and can subsist upon no other vegetation but the asparagus, it is evident that by keeping this plant cut down to the surface of the earth for a couple of months in summer, all the insects must perish for want of food. If no asparagus was growing except in the gardens, it would be an easy matter to keep it thus cut down. But this plant is so fully naturalized that in many places in the neighborhood of New-York I suppose it occurs wild in the field and upon the rocky shores of the sea. Every occupant of the land, however, or the children in his family, will probably know every place in his grounds where this plant, so peculiar in its structure, is growing. Now if these wild plants be cut in the manner stated, say in the first week in June next year, and if with the new shoots which will start up, this operation be repeated every fortnight during two or three months, none of these insects will remain there. And by simultaneously treating the asparagus in the gardens either in the same manner, or destroying the beetles, their eggs and larvæ, by repeated hand-pickings upon all the plants which are allowed to grow, I am confident this insect can be utterly exterminated. I earnestly commend this subject to the consideration of the Horticultural and Agricultural Societies of New-York and its vicinity. Let those Societies co-operate with each other, ascertain how far this insect has now extended itself, appoint a committee in every town where it is present, and select an efficient man in each school district to see that the occupant of every plot of ground on which asparagus grows, is next summer on the alert to combat and subdue this insect, and they can assuredly rid our country of this impending calamity.

East Greenwich, July 18, 1862.

ASA FITCH.

Science and Art.

A Marvelous Machine.

The most curious instrument in the great exhibition is that exhibited by Mr. Peters for microscopic writing, that is infinitely more wonderful than Mr. Whitworth's machine for measuring the millionth part of an inch, which excited such astonishment in 1851. With this machine of Mr. Peters, it is stated that the words "Mathew Marshall, Bank of England," can be written in two and a half millionths of an inch in length; and it is actually said that calculations made on this data show that the whole Bible can be written twenty-two times in the space of a square inch. We must leave a detailed description of this most extraordinary instrument to another occasion, and content ourselves with simply saying that the words to be written microscopically are written in pencil, in ordinary characters, on a sheet of paper at the bottom of the instrument. But the pencil with which this is done communicates, by a series of levers and gimbals, with another minute pencil and tablet at the top, by means of which the ordinary writing of the pencil, and the pencil for the microscopic writing, both move in unison, though the motion of the latter is so graduated that a stroke of a quarter of an inch at the bottom is only a stroke of a quarter of a millionth of an inch at the top, the shape and character of both marks being nevertheless precisely alike in outline. As a matter of course, the microscopic writing at the top is only visible under powerful magnifiers, and the object of the machine is chiefly to mark bank notes with certain minute signatures for the prevention of forgery. Such a precaution, no doubt, would prove an effectual stopper on counterfeit notes, if only all tradesmen supplied themselves with microscopes to examine them, just as a little ordinary care would now detect any forgery.—*English Paper.*

The Naturalist.

[For the Country Gentleman and Cultivator.]

FROGS—INSECTIVOROUS, Etc.

It is not generally known, we believe, that the frog is insectivorous, an eater of insects in a considerable extent; that as most of the species stay near water, they take comparatively few of the insects most prejudicial to vegetation. But we can say that some kinds of frogs by no means confine their propensities to insects; they will destroy young ducks, which go on to the water, or young chickens which happen to come near it. This we had exemplified while residing at Springside. We had a brood of ducks hatched by a hen, which instinctively found their way to a small pool of water, very much to the consternation of the mother hen. After leaving the water, three of the number that entered were missing. On the following morning they were watched by the person who had charge of the poultry on the place. Not long after the ducklings had entered on the water, he discovered a frog in the act of swallowing one of them which seemed rather too large for the capacious mouth of the frog, and stuck fast, the head downward and about one-half of the body projecting. A blow with a long pole soon settled the business with his frogship; on drawing him within reach, life was found extinct in both frog and duckling; but whether the duckling was suffocated or killed by the blow, could not be ascertained. On drawing off the water from the pool, three more very large frogs were found. Probably the frogs would not eat insects enough to make it an object to harbor them; and to feed them with young ducks and chickens, it would not pay—it would be altogether too expensive—even if we should adopt the custom of the epicures and turn the carcass of the frog to the best account. C. N. BEMENT. Poughkeepsie, July, 1862.

A WALK WITH THOREAU.

It was a pleasure and a privilege to walk with him. He knew the country like a fox or a bird, and passed through it as freely as by paths of his own. He knew every track in the snow or on the ground, and what creature had taken this path before him. One must submit abjectly to such a guide, and the reward was great. Under his arm he carried an old music book to press plants; in his pocket, his diary and pencil, a spy-glass for birds, microscope, jack-knife and twine. He wore a straw hat, stout shoes, strong gray trousers to brave shrub-oaks and smilax, and to climb a tree for a hawk's or a squirrel's nest. He waded into the pool for the water-plants, and his strong legs were no insignificant part of his armor. On the day I speak of he looked for the Menyanthes, detected it across the wide pool, and, on examination of the flowrets, decided that it had been in flower five days. He drew out of his breast-pocket his diary, and read the names of all the plants that should bloom on this day, whereof he kept account as a banker when his notes fall due. The Cypridium not due till to-morrow. He thought that if waked up from a trance in this swamp, he could tell by the plants what time of the year it was within two days. The redstart was flying about, and presently the fine grosbeaks, whose brilliant scarlet makes the rash gazer wipe his eye, and whose fine clear note Thoreau compared to that of a tanager which had got rid of its hoarseness. Presently he heard a note which he called that of the night-warbler, a bird he had never identified, had been in search of twelve years, which always, when he saw it, was in the act of diving down into a tree or bush, and which it was vain to seek; the only bird that sings indifferently by night and by day. I told him he must beware of finding and booking it, lest life should have nothing more to show him. He said—"What you seek in vain for half your life, one day you come full upon all the family at dinner. You seek it like a dream, and as soon as you find it you become its prey."—R. W. EMERSON in *Atlantic Monthly* for August.

A CURIOSITY.—A singular instance of the foresight of a field-mouse has just been brought under our cognizance. A person clearing the garden-ground of Mr. Thompson, Dalkeith, came upon a growing turnip which he pulled up by the root. Guess his astonishment when he found that the turnip was completely hollowed out as neatly as if it had been done by the chisel of a joiner, and the interior filled by large garden beans. The work, from the size of the hole whence the inside of the turnip had been extracted, was manifestly that of a mouse, and the object, no doubt, of filling the interior with beans was to provide against hunger in the barren winter weather. Near the place where the turnip was growing there was several stalks of beans, upon which some pods had been left, and it is supposed that the 'cute mouse had helped itself to these. We counted the beans in the turnip—a small one—and found that they amounted to no less than six dozen and two.—*Scottish Farmer.*

The Entomologist.

(For the Country Gentleman and Cultivator.)

No. 35.—THE NEBRASKA BEE-KILLER.

R. O. THOMPSON, Esq., in a note dated Nursery Hill, Otoe Co., Nebraska, June 28th, says:—I send you to-day four insects or animals that are very destructive to the Honey Bee, killing a great number of them, and also of the Rose Bugs. What are they? Is it the male or the female that has the three-pronged sting? Please answer in the Co. GENT., as many wish to know what this Bee-killer is?"

The specimens, two of each sex, laid between pledges of cotton wool, in a small pasteboard box, and forwarded by mail, came to hand in good condition, admitting of a very satisfactory examination. They are a large two-winged fly, having a long and rather slender and tapering body, about an inch in length, with small three-jointed antennae, the last joint being shorter than the first, and giving out from its end and not from its side, a slender bristle. The ends of its feet are furnished on the under side with two cushion-like soles, and the crown of its head is hollowed out or concave, and in this hollow is seen three little glassy dots or eyelets. These characters show it to pertain to the Order DIPTERA, and to the group which Linnaeus a century ago separated as a genus, under the name *Asilus*, but which is now divided into several genera, forming the Family ASILIDÆ. On inspecting its wings, we see the two veins, which end one on each side of the tip of the wing, are perfect and unbroken, and towards the middle of the outer one they are connected together by a small veinlet or short transverse vein. This indicates these flies to pertain to the genus named *Trupanea* by Macquart.

About a half dozen species, inhabiting the United States, and pertaining to this genus, have been described by Wiedemann, Say and others. This Nebraska fly appears to be different from either of those, and I am therefore led to regard it as a new insect, hitherto unknown to the world. And a more appropriate name cannot be given it than that by which it is called by Mr. Thompson and his neighbors, the Bee-killer or *Trupanea Apivora*. The general definition of this species, or its brief essential characters, will be, that it is dull black with the head yellow, the fore body butternut brown; the hind body on its under side and the legs pale dull yellow, the thighs being black on their fore-sides, and it is coated over with hairs which are gray in the female and grayish yellow in the male, the end of the body in the latter sex having a conspicuous silvery white spot.

In this *Asilus* group of flies the species are separated from each other by marks which are often very slight and obscure. It is therefore important that a detailed description of these Nebraska flies should here be given, that they may not be confounded with any other species which may be closely similar to them.

They measure, to the end of the wings, 0.85 to 1 inch, and to the end of the body 0.95 to 1.15, the males being rather smaller than the females. The head is short and broad, shaped like a plano-convex lens, the sides are blue color, the front, and its summit or crown is deeply excavated, leaving a vacant space between the upper part of the eyes, in the middle of which excavation is the ocelli or eyelets, appearing like three black glassy dots placed at the corners of a triangle. The ground color of the head is yellow. All the face below the antennae is covered with long hairs, forming a monstache of light yellow color, with a tuft of shorter black bristles at the mouth, and on each side are whiskers of a yellow or gray color. The base of the head has a sort of collar formed of radiating gray hairs, and behind the upper part of each eye is a row of black bristles. The eyes are large and protuberant, occupying two-thirds of the surface of the head, and are finely reticulated or beaded, and to an immense number of minute facets. The antennae are inserted at the anterior edge of the excavation in the crown of the head. They are small, scarcely reaching to the base of the head if turned backward. They are blue and composed of three joints, the first one longest and cylindrical, the second shortest and obconic, the third thickest and egg-shaped, its apex ending in a bristle, which is about equal to the antennae in length, and is slightly more slender toward its tip, where it becomes a little thickened. The trunk or proboscis is as long as the head, its end projecting out from the bristles of the face. It appears like a lance in shape, hard, shining and of a glossy texture, black and shining, blunt at the end, with a fringe of hairs around the orifice. In one specimen the tongue protrudes from the orifice in the end of the trunk, sharp pointed, and like the blade of a lance in shape, hard, shining and black. The thorax or forebody is the broadest part of the insect, and is of a short oval form, with bluntly rounded ends. It is of a trishielded yellowish brown, or butternut color, with two faint gray stripes along the middle of the back, alternating with three darker brown ones. It is bearded with black hairs, and posteriorly with long yellowish gray ones, which are interspersed with black bristles. The abdomen, or hind body, is long, slender and tapering, its base in the male, and is more broad and somewhat flattened in the female. It is black above and covered with prostrate hairs, which are dull yellow in the

male, and gray in the female. On the sides and beneath the ground color is dull yellow in the male and gray in the female, and clothed with gray hairs in both sexes. The two last segments, the eighth and ninth, are conspicuously protruded, making two or three more segments than those usually visible externally in insects. In the female these segments taper to an acute point, and are black and shining. In the male they appear like a cylindrical tube, with a projecting valve underneath at the base, and are coated over with dull yellow hairs and on the upper side with silvery white ones, pressed to the surface, and forming a conspicuous oblong spot of this color, which is two-lobed or notched at its end. And in the dead specimens before me, the two bristle-like processes, over a tenth of an inch in length, of a tawny yellow color, polished and shining, project from the blunt end of the body. These are termed a three-pronged sting in the above letter. But the magnifying glass shows they are abruptly cut off at their ends, and do not taper to a sharp point capable of piercing the human skin. The legs are long and stout, and of a pale, dull yellowish color. The thighs in the males are chestnut brown, and on their anterior sides they are dull black in both sexes, the hind pair being entirely black, except a stripe of dull yellowish along the under side. The hind shanks also are frequently black on their anterior sides. The legs are coated with gray hairs, and have several black bristles in rows running lengthwise. In the males the four anterior shanks and feet have the hairs yellow, and on the feet the bristles also are of this color. The wings are long and narrow, and in repose are laid flat, one upon the other. They are transparent, with a smoky tinge, and are perceptibly darker at their tips. Their veins are black, except the parallel ones in the outer border, which are a dull yellowish brown. The broad pane or panel at the tip of the wings, which is technically termed the second submarginal cell, rapidly narrows as it extends forward into the wing, for two-thirds of its length, the remaining third being quite narrow, with its opposite sides parallel. Along the vein which forms the boundary of this cell on its outer side, is a perceptible smokiness, which is not seen along the sides of the other veins. This vein is slightly bent in the form of a hook, two-thirds the length of the cell, when it abruptly curves in the opposite direction, and is then straight the remainder of its length. A veinlet connects it to the next longitudinal vein, thus forming between the anterior portions of these two veins a third submarginal cell, which is very long and narrow.

The arrangement of the veins in the wings, forming three submarginal cells as above described, induces me to refer this species without hesitation to Macquart's genus *Trupanea*, although the silvery white spot on the tip of the male abdomen would indicate it to pertain to the genus *Eraz*, as restricted by the same author.

The brief note of our correspondent gives us no particular information upon the habits of these flies or the manner in which they attack and kill the bees. But the members of this *Asilus* group are all so similar in their habits that we are aware what the operations of this species will be. And some account of the habits of these insects may be of sufficient interest to the reader to be here related.

These *Asilus* flies, like some others of our most rapacious insects, particularly delight in the hot sunshine. One or two evidences of this may be here adduced.

Flies of this kind are rare in my vicinity. I suppose I might hunt for days without being able to find a living specimen. And I do not recollect to have ever seen one of them, hitherto, about my house or yard. Three days ago, however, when occupied in preparing this account, I casually spread some damp newspapers before my door to dry in the hot sun. On stepping out to gather up these papers, I was most agreeably surprised to see alighted upon one of them and basking in the sun, what proves to be a species of *Trupanea* which I had never met with before, and which is closely like though probably distinct from this Nebraska Bee-killer. The genial warmth reflected from the white surface of the paper lying in the clear sun, had evidently attracted it to this unusual situation.

So late as the month of October, ten years ago, upon a clear warm day, in a sunny nook upon the south side of a forest I came upon quite a number of the *Eraz rufibarbis*, flying about and alighting upon the leaves—a species I have never met with except in that instance. They were warned into such quickness of motion, and were so extremely vigilant and shy of my approach, that with my utmost skill I was able to capture but two individuals which were impeded in their movements from being paired together. I infer these Nebraska flies to be common and far less wary than the species alluded to—else our correspondent would have been unable to secure two individuals of each sex to transmit to us. And I suspect these specimens were obtained when they were copulated. If so, it is probable that the three sting-like bristles which I have described above, are not protruded and visible externally, except at such times.

In flying, these insects make a very loud humming sound, which can scarcely be distinguished from that of the bumble-bee; and when involved within the

folds of a net, they utter the same piping note of distress as does that insect. This very probably contributed to impress our correspondent with the thought that the three bristles which are extruded by the male are a formidable three-pronged sting.

Another fact which I do not see alluded to by any author, is the fetid carrion-like odor which some of these *Asilus* flies exhale. I noticed this odor in the *Eraz rufibarbis* which was captured as above related. And in these Nebraska specimens, though they have now been dead a fortnight and freely exposed to the air the latter half of that time, this disgusting scent still remains, and so powerful is it that on two occasions nausea has been produced when they have happened to be left upon the table beside me. As the newly captured fly above mentioned is wholly destitute of this fetor, it may be that it is only at the period of sexual intercourse that it occurs.

These flies are inhuman murderers. They are the savages of the insect world, putting their captives to death with merciless cruelty. Their large eyes divided into such a multitude of facets, probably give them most acute and accurate vision for espying and seizing their prey; and their long stout legs, their bearded and bristly head, their whole aspect indicates them to be of a predatory and ferocious character. Like the hawk, they swoop upon their prey, and grasping it securely between their fore feet they violently bear it away. They have no teeth and jaws wherewith to bite, gnaw, and masticate their food, but are furnished instead with an apparatus which answers them equally well for nourishing themselves. It is well known what maddening pain the horse flies occasion to horses and cattle in wounding them and sucking their blood. These *Asilus* flies possess similar organs, but larger and more simple in their structure, more firm, stout and powerful. In the horse flies the trunk or proboscis is soft, flexible and sensitive. Here it is hard and destitute of feeling—a large, tapering, horn-like tube, inclosing a sharp lance or spear-pointed tongue to dart out from its end and cut a wound for it to enter, this end, moreover, being fringed and bearded around with stiff bristles to bend backward and thus hold it securely in the wound into which it is crowded. The proboscis of the horse flies is tormenting, but this of the *Asilus* flies is torturing. That presses its soft cushion-like lips to the wound to suck the blood from it; this crowds its hard prickly knob into the wound, to pump the juices therefrom. It is said these *Asilus* flies sometimes attack cattle and horses, but other writers disbelieve this. Should any of our Nebraska friends see one of these Bee-killers alighting upon and actually wounding horses or cattle, we hope they will inform us of the fact, that this mooted point may be definitely settled. Certain it is that these flies nourish themselves principally upon other insects, attacking all that they are sufficiently large and strong to overpower. Even the hard crustaceous shell with which the beetles are covered, fails to protect them from the butchery of these barbarians. And formidably as the bee is equipped for punishing any intruder which ventures to molest it, it here finds itself overmatched and its sting powerless against the horny proboscis of its murderer. These flies appear to be particularly prone to attack the bees. Robineau Desvoidy states that he had repeatedly seen the *Asilus diadema*, a European species somewhat smaller than this of Nebraska, flying with a bee in its hold. But it probably does not relish these more than it does other insects. We presume it to be because it finds them in such abundance as enables it to make a meal upon them most readily and with the least exertion, that these Nebraska flies fall upon the bees and the rose bugs. And so large as they are, a single one will require perhaps a hundred bees per day for its nourishment. If these flies are common, therefore, they will inevitably occasion great losses to the beekeepers in that part of our country.

No feasible mode of destroying this fly, or protecting the bees from it, at present occurs to me. Indeed such an accurate knowledge of the particular habits of this species as we do not at present possess, is necessary to show in what manner it can be most successfully combated.

ASA FIRCH.

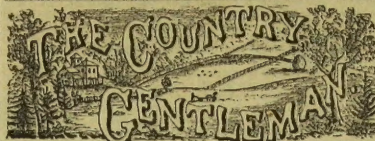
East Greenwich, New-York, July 19, 1864.

New Advertisements.

BEMENT, C. N.,	Shetland Ponies, &c., for Sale.
BROWN & Co., J. B.,	Portable Cider and Wine Mills.
BAKER, GEORGE,	Evergreens for Sale.
BRYANT, ANNER H.,	Great Buffalo Strawberry.
ELKSWORTH & Co., LEWIS,	Gardener Wanted.
LEVIN, JAMES P.,	Sheep Wash Tobacco for Sale.
PARKSON & Co.,	Delaware Grapes for Sale.
REDMOND, WILLIAM,	Leicester Bucks for Sale.
SHELDON, G. L.,	Machine for Digging Rocks.

Acknowledgments.

COMMUNICATIONS have been received during the week ending July 25, from Hiram Walker—E. G.—Josiah Crosby—N. Sargent—J. O. B.—T. A. P.—B. W. P.—S. Edwards Todd—G. B. D.—J. S. Rohrer—John Hogue—C. E. B.—J. E.—John Landrigan—J. R. Paddock—A. G. G.—N. C. M.—J. W. Clarke—S. W.—D. C. Burnett—S. J. C. H.—J. F. C.



QUI CULTIVE A LA FOIS SON ESPRIT ET SES CHAMPS.

Albany, July 28, 1864.

Inquiries and Answers.

Will it Pay to Irrigate?—Through my farm run two brooks (called "branches" here) with fall enough to enable me to throw a small stream of water to the top of a hill forty feet high, and about four hundred feet from the stream to be used, from whence the water could be conveyed so as to effectually irrigate ten or twelve acres of garden or truck land. Will you, or some of your correspondents who may have experience in regard to irrigation, tell me whether it would pay to put up a hydraulic ram, or somebody's pump, for the purpose of irrigating this land, which lies mostly on two sides of the hill? An artificial pond could be formed on the hill, and a good supply of water thus kept on hand. If irrigation is advised, which is the best means of throwing the water up—by ram or pump? N. SARGENT. *Washington City.* [Our own opinion of the advantages of irrigation is so favorable that we should be strongly inclined to recommend its trial, but we shall be glad to receive any experience tending to throw light on the subject if our readers can furnish it. A water ram, or one of the self-acting pumps or "water-engines," manufactured at Watertown, N. Y., would be the means we should employ.]

Agricultural Papers.—E. K. F., *Easton, Conn.* In answer to your request for names of Agricultural papers, we may mention:

The Maine Farmer, weekly, Augusta, Me.
The New-England Farmer, weekly & monthly, Boston, Mass.
The Massachusetts Plowman, weekly, Boston, Mass.
The Boston Cultivator, weekly, Boston, Mass.
The American Agriculturist, monthly, New-York.
The Country Gentleman, weekly, Albany, N. Y.
The Cultivator, monthly, Albany, N. Y.
The Rural American, semi-monthly, Clinton, N. Y.
The Rural New-Yorker, weekly, Rochester, N. Y.
The Genesee Farmer, monthly, Rochester, N. Y.
The Ohio Farmer, weekly, Cleveland, O.
The Michigan Farmer, monthly, Detroit, Mich.
The Prairie Farmer, weekly, Chicago, Ill.
The Wisconsin Farmer, monthly, Madison, Wis.
The Canada Farmer, semi-monthly, Toronto, C. W.
The Farmer and Mechanic, monthly, Baltimore, Md.

Fatal Disease among Sheep.—Last fall I went into the State of Maine and purchased from farmers in the vicinity of the Kennebec river about two hundred and thirty sheep. Being a novice in the business, at the suggestion of Major Chissam, of Augusta, an ardent friend of the COUNTRY GENTLEMAN, which, as he assured me, "was supposed to know everything pertaining to sheep," I at once subscribed for your valuable paper, and also purchased "Randall's Practical Shepherd," and with these universally acknowledged "Sheet Anchores," I set sail, as I supposed, without the slightest chance of getting aground. But the "fates" were not propitious, and I have not only got aground, but have got the "biggest bag" of my flock into the ground also—in short, *Satan* seems to have set his seal upon my doomed flock, and they are daily going, and will soon be gone. Now, I wish to repeat the inquiry, "What ails the Sheep?" It is impossible for me to describe the symptoms of their disease (if it is a disease) for they are apparently well one day and are dead the next, throwing off life with hardly a struggle, and without any warning or symptoms of disease they "go out" like a flickering candle. Please enlighten me, if possible. I have about seventy lambs in the same pasture with the sheep, which seem perfectly healthy and vigorous, and do not at all incline to the foul example of their dams. Some of the sheep swell excessively after death. If they are poisoned, why are not the lambs affected also? Why is it? How is it? Pray tell me! J. C., *North Andover, Mass.* [We submit these inquiries without remark, as we cannot answer them satisfactorily.]

Fences.—In reply to JOHN SCOTT'S inquiry of his brother farmers, I would recommend, if he wishes to prevent the passage of swine, a flood gate; that is, something similar to an ordinary panel or picket fence of suitable length, and suspended by two short chains from a pole resting at each end on strong forks set in the ground on each side of the stream; the pole should be above high water mark. But if he only wishes to fence against ordinary cattle, three or four poles of chestnut or some other light and durable wood, attached by short chains to a substantial post on one side of the stream, and the other ends rested on pins driven into another post on the other side, make a convenient and reliable fence; the poles should be attached at the large end to the post, and then in time of freshet they give way to the water and swing around on to the bank, and can easily be replaced after the water subsides.

Concordville, Pa., 7 mo., 1864. B. W. P.
Blackberry Root Cordial.—Will you please ask some of your correspondents to give through your columns, a good recipe for making a cordial or syrup with the Blackberry root—giving also the best time for digging the root? There is a great call from the householders through the country for the various preparations of the Blackberry, and as the crop of berries is almost a failure this season, in the West at least, no doubt preparations from the root would be extensively made if the process were only known. J. R. PADDOCK. *Cincinnati.*

The attention given in the West to the fattening of cattle, together with the increased facilities for bringing them to market, might appear likely to produce a ruinous competition for the grazing farmer at the East. The extent of the western traffic has come to be immense. Mr. CORBETT of Chicago in an article prepared for the Department of Agriculture, gives the following figures of the receipts, shipments, &c., at that place, for four years:

	Total Cattle received.	Shipped East.	No. packed.	City consumption.
1859,	111,694	37,584	51,506	22,594
1860,	177,101	97,474	34,823	42,074
1861,	204,579	124,146	53,754	26,679
1862,	209,655	112,745	69,687	37,223

In 1861, however, 8,563 head were shipped east by the Joliet cut-off—going around instead of through the city—so that the total shipments for that year should be 132,709 head. In 1862, 41,592 head were shipped in the same way, and 40,230 head by the Great Western road from Central Illinois, connecting with the Wabash Valley road at State Line, which would make the total for that year, 194,567 head. If these figures are correct, the shipments of Western cattle included in the above table were multiplied more than five-fold in the short period of four years!

In the last annual volume (1863) of the Agriculture of Massachusetts, we find a report from the careful pen of Mr. PHINEAS STEDMAN on the production of meat by the farmers of that State, as a source of profit. After alluding to the widely different opinions expressed by different persons on the subject, Mr. S. goes on to show that "it is both profitable and expedient," if not on a large scale and as a primary object, at least as a secondary one, and in connection with other branches. In connection with dairying, the production of pork or raising of veal calves, proves very remunerative; and "the production of mutton in Massachusetts is largely on the increase from year to year, and, as we have reason to believe, with satisfactory results." As to beef cattle, Mr. S. says of *stall feeding*: "If to the value of the beef, the market value of the manure be added, it is still doubtful whether the sum total would yield a full remuneration to the feeder. Yet with the exercise of good judgment in selection and purchase, and with skill and economy in feeding, together with due care in the preservation and application of manure, we arrive at the conclusion that this branch of meat producing is profitable." The three points here alluded to, furnish exactly the secret of success; those who fail may fairly conclude that in one of these they have gone somewhere amiss; for, as Mr. S. proceeds to say, a neglect to bring them into requisition, "serves to reverse the whole operation, and render it unprofitable, if not disastrous." With this caution, however, he still asserts that "those farmers who have been most persistent in this course of feeding, will at least compare favorably with others pecuniarily, while their farms at present are in a higher state of cultivation than those of their neighbors, who have pursued a different and opposite policy."

As to *grass-feeding*, Mr. S. says that it is pursued to a considerable extent in all the five western counties of the State, and with a good profit: "We feel it safe to say that an average advance of thirty-three per cent upon the purchase may be relied upon in return for six months' pasturing, or from ten to fifteen dollars per head. Where suitable stock can readily be pro-

cured, we believe that no better use can be made of a large proportion of our good pasturage."

In the production of beef by either of the above methods, it is taken for granted that the animal is purchased for the purpose—not bred by the feeder. As to *breeding*, as well as *feeding*, taking into account all the drawbacks encountered and expenses incurred, Mr. S. still leans to the opinion that the experiment may be satisfactorily tried. His estimates show but a very narrow margin for profit; and yet, "upon careful consideration of the benefits of spending the produce upon the farm, and the increased advantage in this respect of the production of meat over that of milk, butter, or cheese, to be at once conveyed to the market, it may be well questioned whether the former is not really more remunerative and should not receive increased attention." But much emphasis is properly placed upon the breeding of such animals as will be most likely to pay for beef, when they prove lacking in milking capacity for the dairy; upon liberal feeding, and upon the advantage to be derived by the gradual improvement, by judicious breeding, both of the dairy cows of the State, and of the working oxen by which its farm labor is so largely performed.

Mr. Stedman, and the committee of the Board for whom he reports, assert in conclusion that it is to this source more than any other, that the farmers of Massachusetts must "look for the recuperation and renovation of our somewhat exhausted and sterile soil." Their report is both practical and instructive, and can hardly fail to contribute to the desired end.

Consulting Horticulturist and Landscape Gardening.—Mr. PETER B. MEAD has retired from the editorial chair of *The Horticulturist*, and opened an office at 335 Broadway, New-York, where he proposes to devote his time to the preparation of plans for Green-houses, Forcing-Houses, Propagating-Houses, and all classes of Horticultural Buildings; also plans for laying out and improving grounds, both public and private.

Mr. M. also announces a new strawberry under the name of "Mead's Seedling," raised by him some years ago, and since thoroughly tested. He thinks it has proved itself, "after long trial, not surpassed in some particulars, and in others not equalled."

Electric Theory.—The Genesee Farmer quotes the theory of one of its correspondents, (of course without endorsing it,) in relation to the potato rot, the cause of which he thinks he has satisfactorily discovered. When the plants are kept well cultivated, and the soil porous and mellow, he asserts that electricity or "electric life," penetrates freely through the pores, and maintains a vigorous and healthy growth, but as soon as the plow and hoe are laid aside, the soil becomes compact, and the "electric life" cannot get through it. To avoid this calamity, "conductors" must be spread upon the land and plowed under, such as manure, woolen rags, &c.

The practice is good, the theory rather amusing than otherwise, and is a specimen of the many ways in which those who know nothing of the science endeavor to explain incomprehensible phenomena by the word "electricity." One might as well set up a theory that the music of the bobolink would cause plants to grow freely, provided the necessary requisites were supplied for this music to pass into the soil through the pores, by draining, mellow cultivation, and such conductors of the sound as yard manure and guano. One theory is as good as another.

Cost of Raising Carrots.—L. L. Fairchild of Wisconsin, furnishes the Rural New-Yorker with the average cost of raising the carrot crop, according to the practice of two successful farmers of that State. Lewis Sawyer finds that raising an acre costs him \$39.61, and his average crop is five hundred bushels, or a little less than eight cents per bushel. Col. Lockwood, who manures more highly, and gives very thorough cultivation, finds the cost of raising an acre to be \$59.18. His average crop is over one thousand bushels per acre, or a little less than six cents per bushel. In one instance he raised a thousand bushels on one-half an acre of land.

Success and profit in this crop, depend entirely on doing the work right. To plant on poor soil is labor thrown away, and to employ wet or cloddy ground is no better. The soil must be deep, rich, and finely pulverized, and should be planted early enough in the season to place the plants beyond the danger of early summer drought. But most important of all for profit is a soil free, or nearly free, from the seeds of weeds, for if these